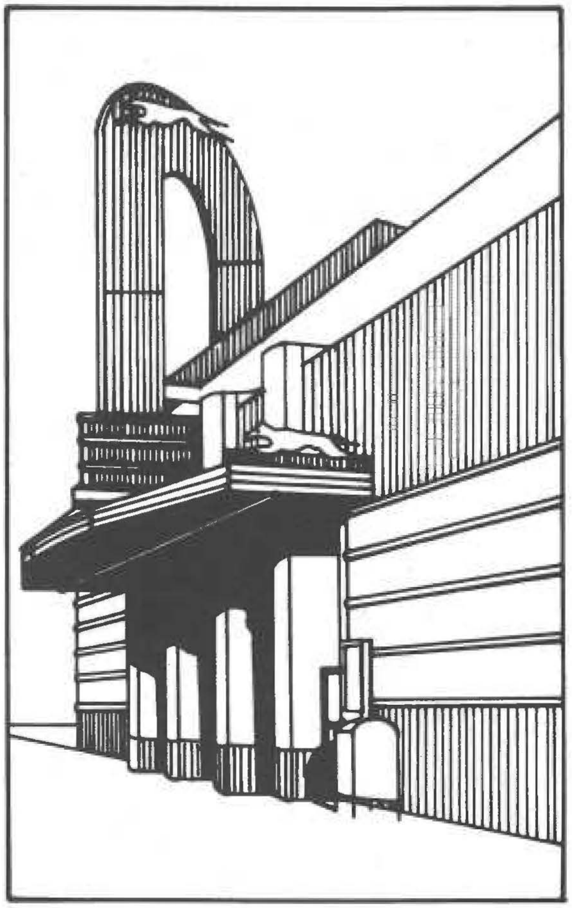
Preserving the Recent Past!



Preserving the Recent Past

Editors
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Historic Preservation Education Foundation
Washington, DC
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H. Ward Jandl
1946-1995

Many people labored to bring this publication to fruition, but it was Ward Jandl's creation. Ward spent his career in historic preservation employed by the National Park Service, and through his work there and through other writing and editing projects, developed an interest and expertise in twentieth-century building types and their preservation. His idea for this publication dates back nearly ten years.

All of Ward's friends and colleagues knew him as an astoundingly productive person with rich and diverse interests in both his personal and work lives. Having begun his career in 1974 at the National Register of Historic Places, he rose through the ranks at NPS to become Chief Appeals Officer and Deputy Chief of the Preservation Assistance Division in Washington, DC. He was the person most responsible for the tremendous success of the federal historic preservation tax incentives program. He also led the National Park Service's program in technical preservation publications over the course of many years.

Ward was a prolific author and editor whose books include *Houses by Mail: A Guide to Sears Roebuck Mail-Order Houses* and *Yesterday's Houses of Tomorrow.*

Ward truly believed in public service and the role that he could play in helping others understand and protect our cultural heritage. His fresh approaches to meeting the challenges of protecting our cultural resources have been an inspiration to many in the field of historic preservation.

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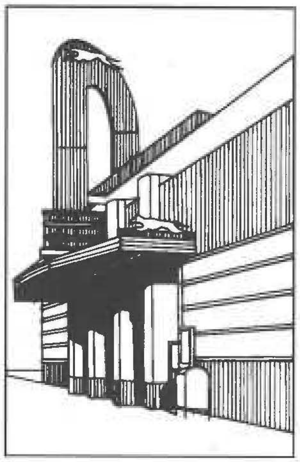

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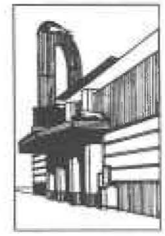

Introduction:
Preserving the Recent Past

H. Ward Jandl
Deputy Chief, Preservation Assistance Division
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Washington, DC

Over the past several years, preservationists have finally begun to devote serious attention to the immense challenge of documenting, evaluating, and conserving cultural resources from the twentieth century. This attention occurs not a moment too soon: it is clear that these are the issues that preservation professionals will be grappling with for the remainder of this century and well into the next millennia.

Our predecessors in the preservation movement fought battles to protect remnants from the Victorian age: buildings and neighborhoods that were not widely appreciated in the 1950s and 1960s by the general public - or by many architects and historians, for that matter. While these resources still continue to be at risk, at least today there is a broad body of information and knowledge about their history, significance, and care.

At the present time, we as preservationists are confronting perhaps the greatest challenge of all: how to deal with the twentieth century built environment. It is hard to identify the defining moment when we recognized that it was time to face up to our recent past: was it when Barbara Capitman pushed to have a good chunk of Miami Beach placed on the National Register? Was it when Philip Johnson decided to donate his Glass House to the National Trust for Historic Preservation? Was it when state and local preservationists fought to save Lockefield Gardens in Indianapolis, a public housing project from the 1930s? Was it when the marble veneer of Amoco's highrise headquarters in Chicago began to fail? Or was it when Connecticut's State Historic Preservation officer requested a determination of National Register eligibility for the Merritt Parkway?

We are faced with defending, documenting, evaluating, and preserving resource types that did not even exist until the middle part of the twentieth century: the shopping mall, the network of highways criss-crossing the country, the curtain wall skyscraper, the housing development, the edge city. What is the history of these new building types and by what criteria should their significance be evaluated? Which of the 2,800 nearly identical Lustron houses constructed around the country between 1948 and 1952 are worthy of preservation and why?

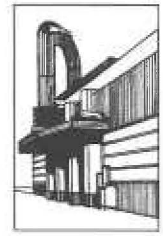
The strategies for protecting and reusing these resources, while owing much to past efforts with eighteenth and nineteenth century structures and neighborhoods, must deal with a scale that is unique to the twentieth century: multi-building, high-rise housing projects, colossal airport hangars, and military bases that are measured in miles not acres. Such strategies must also include a heavy - and particularly creative - dose of education and awareness-building: why should the public care about military structures built during the Cold War? What is so special about mass-produced, prefabrication houses? How can the general public be made aware of the importance of early gas stations, bus terminals, and other roadside architecture?

Enormous challenges also face architectural conservators, engineers, and architects who are beginning to rehabilitate and restore twentieth century resources; the materials in need of

conservation are not only the traditional brick, stone, wood, and iron of yesterday but more complex materials such as plywood, fiberglass, stainless steel, and plastics. Building systems are no longer simple masonry bearing wall construction or wood balloon frame but curtain wall or post-tension concrete. How can these materials and systems be identified and what are the appropriate techniques for repair and replacement? How does one preserve twentieth century materials that may be identified with significant health problems?

The serious study of the recent past is a relatively new phenomenon; there have been few scholarly books on the subject, and articles in professional journals are few and far between. The papers included in this handbook were presented at an in-depth, national conference on preserving the recent past, held in Chicago, 30 March through 1 April 1995. The conference was organized specifically to bring together preservation professionals from North America and Europe to consider the unique challenges of preserving twentieth century historic resources. The handbook is divided into four broad sections: resource evaluation, preservation and reuse strategies, conservation of twentieth century materials and systems, and history and preservation of curtain wall construction.

There are over sixty essays by academicians, engineers, historians, planners, architectural critics, and preservation practitioners from a variety of disciplines. The subjects cover an extraordinary range of issues, from preserving reinforced concrete at Fallingwater to evaluating contemporary landscape architecture. Some of the papers will challenge the reader to expand the notion of what constitutes an "historic resource"; others provide innovative approaches to resource identification and materials conservation. All are thought-provoking. Together, they greatly expand the body of practical information available to preservation professionals on evaluating and protecting the recent past.



A Search for a Twentieth-Century Architecture

Morris Lapidus
Architect - Interior Designer
Miami Beach, Florida

Selecting a Profession
Upon finishing my high school studies I found that I excelled in two fields, acting and art. I chose acting as my career. I enrolled in New York University at Washington Square, which was known for its fine dramatic department. It had a fine little theater. Before I finished my freshman course, I found myself designing and painting scenery, designing costumes and even playing small parts in the company's productions in what was known as "The Washington College Players." There was another acting group known as "The Washington Square Players" who decided to form a group that became the famous Theatre Guild and produced plays on Broadway. For their first play they needed some young men to read for "boys" parts. I was sent by the head of our players and was hired as an understudy. I was finishing my junior year, so I could attend rehearsals and continue with my college work. There is nothing more thrilling than opening night on Broadway, but I sat in the wings. After two weeks of Broadway, I realized that acting was far from a glamorous life. I loved the theater with its color, its scenery, its lighting, but I hated the interminable waits between cues to enter stage right.

I decided that what I wanted was to become a scenic designer. I visited several famous set designers who all asked the same question, "Do you have architectural training?", because architecture was part of set designing. I decided to leave New York University and enroll for an architectural course, still believing in my ambition to be a set designer. From the start, I fell in love with architecture. Now my future was set; I was going to become an architect. Many years later an author of a book called *Tropical Splendor* devoted a chapter to my work. He wrote, "Morris Lapidus studied architecture to become a set designer. Unable to find a job in his chosen field, he went to work for an architect. But he did get to design his sets — not in theaters or movie studios, but as controversial commercial architecture that took the nation by storm."

Architectural School
I entered the Columbia School of Architecture in 1923. The elderly professors had their training in the middle of the nineteenth century, mostly at the *Ecole des Beaux Arts* in Paris. Our training was based on the Paris *Ecole*. We studied the history of architecture through the ages ending with the "Art Nouveau." Modern architecture was taught by the Dean. Although he spoke of twentieth-century architecture, it was in a derogatory manner. He accepted Louis Sullivan, but he intensely disliked the work of Frank Lloyd Wright. His idea of modern architecture was what he called "eclectic," taking its cue from classical architecture, interpreted in a twentieth-century style. His own great building was the massive structure of Ellis Island. Besides history, we were taught perspective, shades and shadows, water color, charcoal drawing from plaster casts, sculpture and life drawing. It was as if we were studying at the Paris *Ecole des Beaux Arts*. The other important studies were almost half of our curriculum; designing buildings. They were called *projets*, the French word for projects. We worked in an *atelier*, now called a drafting room.

My Career in Architecture
I spent my fourth year working for Warren and Wetmore, a large prestigious firm whose great-

est work was the design of the Grand Central Station in New York City. I only had my engineering work to finish, which was taught in Schermerhorn, the engineering school, where I was able to attend at night. I was hired by Warren and Wetmore thanks to a flattering letter of introduction written by my art professor who called me a "brilliant young designer."

How had I accomplished four years of work in three years? Again, I must mention the Beaux Arts method of marking our projects. If you passed you were given a "mention" that earned you three points. If your work was better than average you were given a "mention placed," this gave you four points. If your work was exceptional, you were given a "first mention placed" which resulted in five points. My work usually earned "first mention placed," so I finished my design course in three years. At Warren and Wetmore, not knowing what to do with me, they gave me a set of prints for a mansion *[for the Vanderbilt family]* in North Port, Long Island, which was almost completed. They asked if I had any suggestions. I now realize they just didn't know what work I could do. At this stage of my career I was a serious, shy young man. I carefully reviewed the plans of a building designed in the Spanish Renaissance style, which was the style espoused by Addison Mizner in his Florida work. I pointed out that there was a serious anachronism in the carved ornament over the garage. The sculptor had designed a large wagon wheel and a full sized head of a horse. Did I have any suggestions? I pointed out that this was a garage, not a stable. I was asked to make some sketches. This was the first professional drawing of my career. I used the front end of a Packard automobile with the radiator designed in a Spanish arabesque pattern. For the usual ornament placed on top of the radiator, I used a head of Mercury, the God of Speed. For the fenders I used huge acanthus leaves borrowed from Roman Capitals. The license plate was dripping with Spanish arabesque ornament. That ornament still adorns the garage of the Vanderbilt mansion.

Although I became a junior designer, I had to quit my job to go back to Columbia to complete my thesis. I graduated and went job hunting, with an ample portfolio of drawings. My first job lasted six months; the office ran out of work. At this stage, 1927, a fraternity brother asked if I would be interested in making sketches of stores for a firm hiring young architects to work at night or weekends. I had obtained another job in an architect's office at a salary of seventy-five dollars. I was interested in augmenting my income and met Evan Frankel, who was a partner in a firm called Ross Frankel. Frankel was a persuasive salesman and his partner was a Russian-trained cabinet maker. Cabinets were the most important part of the store; store fronts were simple and elementary. My first few sketches, when shown to prospective store owners, usually resulted in sales. I kept trying to make my sketches more and more innovative. The partners were so pleased with my work that they decided it would be good business to hire me on a permanent basis, offering me five thousand dollars a year; what was more enticing was the fact that I would no longer have to work in an architect's office during the week and could cut out my "moonlighting" on weekends and evenings.

I refused their offer, telling Frankel that I had given up an acting career, then given up a set-designing career, and I certainly would not give up architecture. I did not consider store design architecture. I had a wonderful sweetheart whom I would eventually marry when I earned enough to start our married life. Eventually, so successful were my store designs, which were bringing better and better businesses to the firm, that they offered me the astronomical salary of ten thousand dollars a year with a prospect of becoming a partner. So I gave up architecture and married my sweetheart.

Store Design

Now that I was no longer an architect (I thought), I really began to make a true study of what I was trying to accomplish in my new field; the year was 1928. My stores obviously were meant to attract more customers; how do I do that? I began a study of human nature; it was a study that never ended. I began by going back in time and before I knew it, I was reading extensively in anthropology and archaeology. I wanted to know what made men and women behave as they did, especially in the field of their likes and dislikes. My first theory was from earliest times: people loved color. My next theory was that they were influenced by ornament or adornment. My next discovery was what I called the moth theory; people, like moths, are attracted by strong light. My final discovery was that people liked curved, sweeping spaces.

With all of these and other theories, I began designing newer and better stores. The average

store now had deeper and deeper arcades so that merchants could attract customers. I reasoned that the wall that separated the new type of store front was a hindrance; people looked at the windows and then walked on. Why create a barrier, why not remove the barrier - the answer, a wall of glass that put the entire store on display.

Another thing that I began using was strong identification. I studied graphics and these graphics became an important part of my store design. I was now nearing fifty years of age. I had earned the title of "Father of Modern Merchandising." Then came what I had often dreamed of, becoming a true architect, not just a store designer.

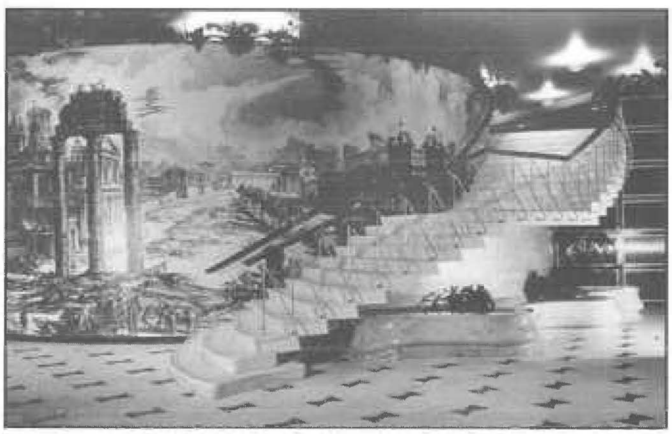
Hotel Design

One of my satisfied clients, the Vice President of a large chain of stores, himself an architect, called and asked if I could have dinner with him and a friend from Miami Beach who was about to start building a new hotel. We met, and the reason my client wanted me to meet his hotel friend was that he was unhappy with his own plans. He wondered if I could make some suggestions, add some of my flair to his hotel. I made some sketches (I had never designed a hotel), which he loved. The end result was that I became the associated architect. I practically redesigned the architect's plans. This happened in 1949. The hotel was so successful that I was called by five other hoteliers who were building hotels in Miami Beach to "doctor" the plans of

Rainbow Shop, New York City (1947)
I began store design in 1928. Mine was a constant search for a "Twentieth-Century Style." After twenty designs, I found what I was looking for. This free-flowing design influenced not only my store work, but all of my future architecture - to destroy the "Box."

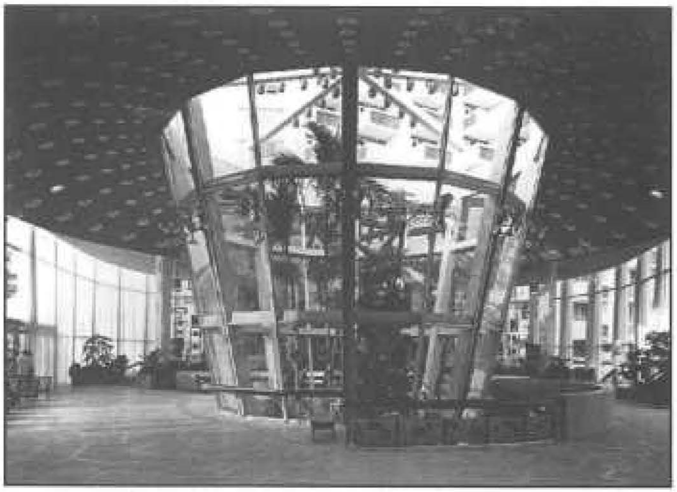
The Fountainbleau, Miami Beach, Florida (1954)
In my very first building as an "architect," I used the same theories that I had created in the 1950 store. My Fountainbleau Hotel cast aside the "International Style." People loved it, but the critics were aghast. It never had a sign, but was instantly recognized. The building behind is the second of my hotels, The Eden Roc.

Top: The Fountainbleau, Miami Beach, Florida (1954)
My sweeping, flowing design created a sense of drama never before achieved in a building. It was a hotel that expressed pleasure and relaxation. That is what people wanted in a hotel.



Middle: The Fountainbleau Interiors, Miami Beach, Florida (1954)
When I studied architecture at Columbia, we were taught that the interior of a building was an integral part of an architect's function. This curved wall and its curved, floating stairway is a fragment of the entire interior design. It eventually earned the title of the "Stairway to Nowhere."

Bottom: The Eden Roc Hotel, Miami Beach, Florida (1956)
My second hotel was more severe because of the architectural critics who intimidated me. But it still has an entrance lobby, expressed in the building design that creates a feeling of welcome, joy, and happiness that the guests expected when they arrived.



The Americana Hotel, Bal Harbour, Florida (1957)
The entrance features facing the arriving guests sets the stage for the excitement of a hotel that will satisfy everything that they are looking for when they come for a vacation, a feeling of getting away from their mundane world.

International Inn, Washington, D.C. (1960)
This hotel uses the curved plan for a hotel. The huge dome can be opened up by a motor-driven device that makes it an open-air swimming pool for the summer, or when closed, a warm space for year-round use.

their architects. I soon was called "a hotel doctor."

In 1953 my original hotel owner decided to build the largest and most glamorous hotel in Miami Beach. I decided that I wanted the commission and, in the end, I was successful. I was awarded the commission to design the hotel and the interiors, and to have the privilege of selecting and designing everything including the uniforms for all of the employees. The rest is history. At last I was a true architect. The public loved it and now, forty years later, it is still one of the best known hotels, not only in America, but in Europe and South America. I was through with store design. I went on to design not only hotels, but office buildings, hospitals, schools and apartment houses. How and why did I achieve this?

It all started when I was given a chance to design the ornament over the Vanderbilt garage. It began when I decided to design stores, stores that helped merchants sell more merchandise. It started when I decided on a life-long study of the tastes of Mr. and Mrs. Public. I had the opportunity that few architects had. I wasn't designing buildings, but stores that could be designed and built in less than one year. This was my laboratory, in which I put John Q. Public

and his wife and children under an imaginary microscope to find out what the American public liked and accepted. When the magical opportunity came to design my first building, a hotel, I used everything I had learned through years of study.

What was I looking for throughout the years? Simple! I had finally found my answer to my search - the Twentieth-Century Architecture! A style that meant freedom to design buildings in any shape and form, just as long as twentieth-century people liked it.

All was not as wonderful as it sounds. Yes, people liked what I did, but the critics hated my work. This hatred persisted until about five years ago (1990). A Swiss publisher (the Europeans loved all of my work) published a monograph of my work titled *Morris Lapidus, The Architect of the American Dream,* in 1992.

What is our twentieth-century architecture? It is a freedom to break away from the past. It lets architects design a free-flowing plan that creates free-flowing buildings. The days of designing "boxes" were over. We have the techniques and the sciences to let us create buildings that people want. We don't need the critics to tell us what is right or wrong; we have the freedom to carry us into the twenty-first century.

But let us preserve what this century produced. There are many fine structures that showed us the possibilities that are now open to us, the architects of today!

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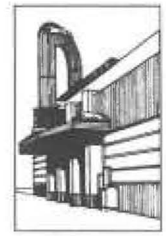


Preserving a Recent Past

Bertrand Goldberg, FAIA
Bertrand Goldberg Associates, Inc.
Chicago, Illinois

When I was an architectural student at the Bauhaus in the Germany of the early 1930s, there was a rumor about Russian buildings: their architects, it was rumored, built a bomb in the cornerstone of every major building. The bomb was designed to explode in twenty-five years to assure the modern rebuilding of the Russian cities every twenty-five years.

Today, we introduce a conference whose theme is *Preserving the Recent Past*. Does this mean that we shall abandon the art of building a contemporary world? Have we changed the timing of our mission from the *present* to the *past*? I think not.

But I believe at the opening of this conference, we should examine the meaning of its title and discover how the recent past includes our future. What shall we use from the past for our future?

What does the conference title mean: *Preserving a Recent Past*? In the handbook of this conference, in addition to "preserving" the past, I also find the word "conservation" with the past. I am unsure if preserving and conserving mean the same thing or even if this conference means to adopt either one.

To "preserve," Webster says, is to "keep from destruction."

To "conserve," Webster says, is to "keep from change."

Have we come together for these next couple of days to do either of these things? Have we found the past more comforting than the present or the future? Have we come here as *architects*, to merely learn about new mortar joints and window replacements? Or, as *planners*, to learn how to save our earlier streets or school systems - neither of which seem to work for a contemporary world? As *environmentalists*, do we come here today to review our park systems, or plant more trees? Certainly, our mission in this conference is larger and more important than any of these Sunday - supplement issues.

This conference covers the years between 1920 and 1960. During this period, those of us who weren't "Modernists" were "Futurists." The Japanese, for example, after World War II had a cabinet position for futurist planning. I doubt if any of us, in these earlier years, would have attended a conference to discuss the "past." We wouldn't have attended a meeting that didn't discuss the "modern present."

Is this conference then, a recognition that we are nostalgic, giving up "modern" or "future"? Are we now ready to give up our own period of culture and creativity and look to the past, for what, in retrospect, seems to have been a better life? A more fruitful time?

Obviously, 1920, the beginning of the "past" for this conference, was the end of World War I. But this same year, 1920, also marked the beginning of vast changes between the two wars that, when viewed together, put an end to what we loosely called the Victorian world and launched what we call modern society. By 1960, we were able to identify these changes in the science, in the economics, and in the governments that were the immediate results of each separate war. This conference, in its selection of a time span, must look to preserve the important changes, the worthwhile developments, and the new society

that emerged from those forty frantic years devoted to war. Amidst that unprecedented rate of political and scientific change between 1920 and 1960, we must choose what we consider worthwhile to preserve for the future. Rather than "conserving," we are looking for these earlier changes we wish to preserve and better utilize in the present.

Perhaps the greatest and gravest change in the recent past that deserves attention in this conference is the destruction of urbanism and the unregulated expansion of its twin - suburbanism. For so many years in our past, our nineteenth-century cities were the hard indestructible core of our centers of government, as the generators and preservers of our culture, education and business; what we could see of the suburbs, we relegated to the status of an urban appendage. But if we look back at our recent past, we can now see we were mistaken. Our government, since the 1930s, has advocated two policies: first, which has cost billions to support, that suburban mice are cleaner, smarter, and nicer than big city mice and that it is easier and quicker to move our increasing population to a new suburb than to solve their problems of living in decaying nineteenth-century cities. The second policy advocated by our government, which it has failed to pay for, is that cities should house the poor and the jobless. While the government paid for our suburbs, it ignored the immense costs building up to rejuvenate our cities in order to achieve this population shift.

Camden, Cleveland, Detroit, Chicago, New York, Miami - this is a partial list and the reality of increasing urban failures that began (while we weren't watching) in the recent past. The city failed to keep its promises to new numbers and to support the good life for children, adults, rich or poor, in the manner that gave growth to living in America. Yet America believes, in both its family life and government, that our cities must survive. This conference, I hope, will suggest what we can preserve from the recent past to assist that survival.

By looking to the recent past, the period between 1920 and 1960, we find a need arose for the first time for our government to protect and shape our urban environment for modern living. And, although it is somewhat surprising, only during the period of "our recent past", did our government *first* face that need and assume the responsibility for both the protection of our environment and the function of our buildings. For example, only when Franklin Roosevelt, in 1933, proclaimed his famous "Four Freedoms," did the government assume both the authority and the moral responsibility for providing urban financing, zoning, and housing enablement for the poor as well as affordable housing. Roosevelt also provided the FHA for financing America's move from the cities to suburbia.

In contrast, the preceding president, Herbert Hoover, advanced these same ideas for fiscal programs, but rejected them as government responsibilities. He believed them to be areas for development by the private sector. Roosevelt's proclamations of *governmental* action to both *regulate* our environment and *plan* our environment became a challenge to the upper-class private sector; as Roosevelt announced at his nomination, "They hate me, and I welcome their hatred."

This announcement of governmental authority and action to provide housing for the rich in the suburbs and for the poor in the cities also spawned two new national industries: prefabrication of housing and the construction of new towns. These new towns were planned first for the war industries and, following the war, for a public policy that decided existing cities were undesirable places for middle-class living. The population shift from urban to suburban living was not to open new frontier land; it was a new commitment by the government to *single family housing*, for which the government invested billions of dollars in the infrastructure that created suburbia.

In September of this past year (1994), our government reminded us of this policy when it opened a year-long architectural show at the National Building Museum in Washington, called "World War II and the American Dream." The architectural and planning work of Frank Lloyd Wright and his Broadacre City, the work of Louis Kahn, George Howe, Charles Eames, Eero Saarinen, and some of my own designs are included in this show of war and its influence on the American Dream. Eighty per cent of everything built in America has been built since the end of World War II, much of it in American suburbia. Some dream.

The exodus from city to suburb has been documented in our recent past, but between the end of World War I in 1920 and 1960, we must recognize that *two vigorous movements* began: the one more evident was to shift middle-class people from urbanism to suburbanism, and *the*

second was to move the poor people into the cities. Throughout America, England, and Europe, the force of housing the newly emerged poor and jobless created a new urbanism whose growth actually exceeds that of new suburbia. For example, in the United States, the impoverished class moved from the farms to urban centers where industrial jobs were located and where federal entitlements were administered and dispensed. Nicholas Lemann recently wrote that during World War II, it was wartime jobs that brought the United States' southern tenant farmers to the cities in vast numbers. Following the war, he wrote, it was the mechanization of cotton picking that pushed the jobless cotton pickers into northern US industrial cities. But we can see this same shift in developing countries throughout the world, where cotton picking was not an industry, as the impoverished classes also began, first slowly and then as an avalanche, to move from poor countries to richer countries and then from the rural districts to massive urban centers. This movement by 1960, throughout the world, had created 111 cities with populations over one million, and as it continued, by 1990, there were 288 cities whose population exceeded one million.

By 1985, there were about 5 billion people in the world: more than 100 million people were living outside of their countries of birth or citizenship, presumably, in cities. Today, 1.4 billion people throughout the world live in cities. The United Nations forecasts that by the year 2025, 4.1 billion people will live in urban centers.

These cities in every country will breed an assortment of problems for which we have few solutions. We do not know how to bring new jobs to our cities and protect the environment that supports the jobs. We do not know how to attract new taxpayers to the city and provide them with affordable housing. We do not know how to allow vast populations to come to our cities while we protect them against their children as well as against each other. Can we hope to find any solutions for these problems from the history of our recent past?

Can these problems be solved by architects and planners, or by priests and politicians? Since World War II our urban growth has brought us problems for which architects had no apparent answers; problems that have exceeded any constructive human understanding. The studies of urban buildings, urban problems, urban economy and urban sociology seemingly have become a *new science* for new scholarship. But in practice, this conference can be the time and place for architects and planners to broaden their contributions to our society as they address the solutions for saving our cities.

Our buildings and their environments from 1920 to 1960 are reasonable places to discover what we can conserve from the past to preserve our future. *Churchill once said we shape our buildings and our buildings shape us.* During these forty years from 1920 to 1960, what notable changes and developments in our buildings reshaped our society and our environments that now can rejuvenate our cities?

In my own experience, it was late in the 1950s when the "Janitor's Union," the International Union of Building Service Employees, came to me and asked for a housing design that would demonstrate that living in the center of the city could be attractive and economical. The Janitor's Union knew their jobs were disappearing in major cities, first during the Depression and then as tenants in major buildings were moving to suburbia after World War II.

Since the Depression, the Janitor's Union watched the concepts of *community and neighborhood* disappear from the city. During the 1930s, housing in major apartment buildings began to move outward to single family houses in suburbia. The forces that hold people together: ethnic roots, church, family living, jobs, unions, common goals, dissolved in the universal collapse of capitalism.

Today, it is evident that the community that which formed the urban neighborhoods of the past is lacking. It is not only sentimental nostalgia for the community in the recent past that leads us to believe it is a value to preserve for the future. We recognize this sentimental longing for community; we have even given it a cult name. We call it *Communitarianism.* I am a *communitarian.* But beyond this sentimentalism of nostalgia, we feel for the first time, a cold, continuing reality of urban destruction that we can resist only by forming communities: *community for survival.* Cities cannot survive without community, wherein we can share our lives and our culture and together find solutions.

When in 1959, the Janitor's Union came to me for the architecture of Marina City, my solution first was to again give them an urban community in the center city: a city within a city. I designed a critical mass for living, which could

generate a new demand for commerce, recreation, and business. Marina City had what I still believe is the densest plan for housing in the world: 635 dwelling units per acre, which was designed with a footprint of only a twenty percent land coverage. This pattern, sixty-five stories high, based on major European urbanism, continued what my mother-in-law once described as "living above the store."

This architectural design was made possible by a wartime (1940-1945) development of technology: the high speed elevator, the cleaner air from an all-electric power system, heating by light, the recycling of energy from use of river water for cooling, an innovative construction engineering based on new availability of 9,000 pound concrete. The use of this technology gave us at that time the highest concrete buildings in the world, the tallest apartment buildings in the world, the densest population center in the world. During the past thirty years, Marina City has become a laboratory for a new kind of urbanism: a unique laboratory that demonstrated that the mixed use of fourteenth century European cities was a natural form for American urban community for work and living.

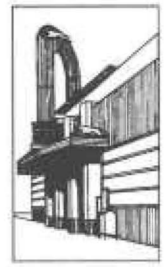
While for the first twenty years, this living laboratory was a financial success that paid its taxes and its income for the Union developers, during the past ten years it demonstrated the importance of *maintaining* an economic planning strategy, as well as its engineering inventions.

Marina City was conceived in its original plan as a total rental community, for business, recreation and housing. Its housing tenants and commercial tenants paid their rents to a common owner - the Janitor's Union. But in 1982, the Union permitted their ownership of the housing to be sold as condominiums for enormous profits to a few individuals within the management group, selling the remainder of the project to a commercial owner. And at that moment the community interests of the total project were divided: the new commercial ownership was no longer concerned with the well-being of the housing tenants; in turn, the new housing owners no longer regarded the commercial income as a benefit to housing.

Marina City could, and did, withstand the wear and tear of time: it could not withstand profit-taking. The interests of its housing and its neighboring commercial tenants no longer were community interests that shared a common objective of protecting the environment. The commercial ownership became a poker chip in the game of "real estate," and its remote Texas-based owners went broke; their bankers went broke. The Resolution Trust (Corporation) said "drop dead." And the commercial part of Marina City was resold at auction. The housing residents, 1,500 strong, have waited patiently to join their adjacent business tenants in forming a total community, as originally planned. The pieces of that split are once again being assembled with a new enlightened commercial owner to reestablish Marina City as an urban community.

As a social laboratory, Marina City has successfully demonstrated during the past thirty years that the revitalization of our cities will best be preserved by recreating the urban communities that were both motor and mirror of our recent past. As a technical laboratory, Marina City has demonstrated that high density can be pleasantly sheltered and can help to preserve, as well as utilize, our environment for urban rejuvenation and future generations.

I can remember that one time in my design life, I also believed that human enterprise was of such temporary stuff that our buildings should be replaced every twenty-five years. And I designed a new hometown for General American Transportation Co. that built in - not a bomb - but a dollar reserve to replace the 2,500 houses every twenty-five years. But today, I believe we will find in our recent past all of the discoveries we need, both technological and sociological, to forge a successful urbanism. We will find that we have the resources from the past to build whatever we think for the future. We have come together today not for new technology, but to share what was there. Our past has given us the ability to build whatever we think. What should we think to provide for the twenty-first century? To preserve our recent past is to preserve our future.



I Can't See It; I Don't Understand It; and It Doesn't Look Old to Me

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The champions of modern architecture seldom missed an opportunity to ridicule the past. At best, the past was treated as a closed book whose chapters had mercifully ended with little bearing upon the present. But often the past was portrayed as an evil. Both buildings and cities created since the rise of industrialization in the early nineteenth century were charged with having nearly ruined the planet. The legacy of one's parents, grandparents, and great-grandparents was not only visually meaningless and degenerate, but socially and spiritually repressive as well. Architects such as Walter Gropius and critics such as Lewis Mumford saw the contemporary city as so much detritus. The more of this alleged blight that was removed from the scene, the better.

Such sweeping indictments of the built environment in architectural and planning circles added fuel to the cause of historic preservation in others. It is no coincidence that the National Historic Preservation Act was created at a time when the Modernist cause seemed to be exercising a major hold on federal policy. This relationship, among other things, makes it difficult some thirty years later to consider the legacy of Modernism itself a valued thing of the past. Furthermore, Modernism is still with us. It can be argued that more of its agenda has been realized over the past twenty-five years than over the previous half century. Nevertheless, the products of a generation ago are assuming a new dimension and indeed can be examined from a fresh perspective. In their particulars and sometimes in their basic attributes, many of these works are quite unlike what we choose to create today. What was called by its proponents simply "Modern Architecture" does not always seem modern any more. The issues beg our attention. Let's take an example.

The Southwest redevelopment area, in Washington, D.C., fully manifests the Modernist imperative. Planned in the 1950s, with most of its components in place by the mid-1960s, this model venture retained but a few vestiges of the previous urban fabric. Street patterns and block size were modified. New construction increased density and open space at the same time. Planning struck a balance between accommodating automobiles and pedestrians, separating the two wherever possible. The project was a consummate manifestation of federal urban renewal programs, when wholesale clearance and sweeping new designs were irreproachable objectives. It was comparable to the Mall, a few blocks away, in that nothing of its kind in the country was more ambitious, more fully realized, and, arguably, more accomplished in its design.

Locally, the Southwest project represented not only major physical and demographic changes. It also, for the first time, allowed Washington-based Modernists to exhibit their talents in a conspicuous way. The precinct stands as a veritable pantheon to the best and brightest designers the city had to offer: Clothiel Woodward Smith, Charles Goodman, Keyes Lethridge & Condon, among others. There were also contributions from famous practitioners elsewhere, including Harry Weese and I.M. Pei.

These facts, along with many others, are now appropriate ones to delineate the historical significance of the project. We would not question them were this area developed a

hundred or seventy-five years ago, and we should not from a distance of some thirty years either. The scheme no longer represents the present: the buildings, the planning elements, indeed the whole approach are very different from anything in our current vocabulary. Yet the project possesses an enduring value, and not just as a museum piece. Many residents are devotees, who live there because of its special qualities, and sometimes fondly refer to their neighborhood as Brasilia. The idea that it should become a historic district has been entertained (though as yet not seriously pursued) by residents who, just as Georgetowners and Alexandrians a half century ago, fear that outside forces will alter those material and spatial attributes that make the Southwest like no other place.

One other example, somewhat earlier and lacking a solid internal constituency, is like the Southwest a benchmark development of its kind. The complex is called Shopper's World, and it lies in Framingham, Massachusetts, some sixteen miles west of Boston. When it opened it 1951, it was the second regional shopping center, developed as a fully integrated business around a core pedestrian area - a mall - to be realized anywhere on earth. (Northgate, which opened the previous year in Seattle, was the first.) Furthermore, it is the only one of the first generation of regional centers, and perhaps the only one operating prior to the 1960s, to remain in anything approaching its original form. Shopper's World thus is the foremost example we have of the initial thrust in a trend that has revolutionized both shopping patterns and the development of outlying areas in the United States. Like the Southwest, it embodies beliefs that the old order could not meet contemporary needs, that radical new solutions were needed, in this case in a setting far removed from the traditional urban core. Like the Southwest, Shopper's World should be a National Historic Landmark, although arguing the point is now academic because it was leveled in December, 1994 - for a parking lot.

Why do we have trouble coming to terms with resources of this kind? Why do bureaucrats shake their heads and mutter they do not want to hear about it when the possibility is raised of creating a historic district in the Southwest? Why do others doubt whether Shopper's World could even be declared of exceptional significance for the National Register listing? To do so only requires demonstrating it is exceptional at the local level, when this mall complex is clearly of national, perhaps international significance. Why was the only local effort one to save the structural skeleton of the anchor department store, an interesting artifact in its own right, but one with little direct bearing on the design's transcendent importance in the postwar era?

Part of the problem is that often we do not "see" the landmarks of the mid-twentieth century. They are not sited like their forebears. The landscape that they help form is not centralized. Rather it is multi-nucleated, as the geographers call this structure, and those nucleations often lack traditional focal points. The Southwest has a major thoroughfare, but it does not provide any vantage point from which the precinct can be best appreciated. Shopper's World was hardly noticeable from its approach routes, even when it stood in isolation, before the array of surrounding businesses began to be built, as a result of the mall's great drawing power. Moreover, the cumulative result does not tend to read as a district. In traditional terms the strip lacks visual coherence. Similarly, little apparent relationship exists between such groupings from one part of a metropolitan area to another.

Examples of this kind are the rule for the mid-twentieth century rather than the exception. Chances are that the elementary or high school does not monumentally crown a hill, or terminate a major street, or otherwise conspicuously demark its importance in the community. More likely it is sited well back from the road, from which, if it is visible at all, it appears as a series of unobtrusive pavilions. A number of headquarters and regional office buildings of major corporations, such as Reynolds Aluminum and John Deere, are the polar opposites of their skyscraper precursors, sited like great country houses, on the outermost edge of the city in large, lush park preserves of their own. It is easy to cast such work as anti-urban when compared to the centralized structure of the industrial metropolis that emerged during the nineteenth century. However, the past fifty years have shown us that there is a clear new order in recent growth, that it is distinctly metropolitan in nature, and that it is an outgrowth of the old, more traditional one.

Perhaps no type is so central to preservation, in the popular mind at least, as the single-family house, and here, too, modern architecture defies convention. The great modern houses do not line Main Streets, nor do they cluster in well-defined

and readily viewable enclaves such as Roland Park in Baltimore or the Country Club District in Kansas City. Most are as invisible to the public eye as the mountain cabin, marked only by an unassuming driveway leading through dense foliage. Even in communities that possess an abundant collection of noteworthy examples, New Canaan, Connecticut, for instance, or Princeton, New Jersey, little is known about this legacy except through individual encounters with domiciles owned by friends. And even when property sizes are smaller, the setting not quasi-rural, the perceptual impact often is no greater. Los Angeles affords a telling example, with scores of great domestic works from the mid-twentieth century sequestered on tiny hillside sites, seen by the few who drive the winding roads as sheer walls, garage doors, and vegetation. The richness of plant life in California is such that it can completely subsume a building, such as Richard Neutra's Nesbitt house of 1942, without the aid of topographical variation. Thousands of people could pass by such a dwelling each day and never "see" it.

Irrespective of siting particulars or of landscaping, modern architecture often cannot be understood, let alone appreciated, from seeing one or two exterior elevations. The single outside photograph or brief description may, in fact, deceptively suggest something of little consequence. Movement around and through the building, or the building complex, may be essential to grasp the salient qualities of its design. Just as the experience is frequently more internal and private than external and public, so space is often accorded primacy over form. To understand modern architecture, one must look beyond motifs and veneers. Modern architecture did not just eliminate ornament; it did not just eschew references to the past; it did not just emulate a machine aesthetic; it entailed challenges to theretofore basic assumptions about the properties of design.

Understanding modern architecture poses another challenge as well. Despite innumerable claims to the contrary, it has never been monolithic, but rather defined by an array of differing individualistic approaches to design. The result is an assemblage of personal modes. Look at the picture around 1955: the laconic structuralism of Mies van der Rohe; the geometric organicism of Frank Lloyd Wright; the understated abstractionism of Richard Neutra; the "soft" naturalism of William Wurster; the flamboyant expressionism of Bruce Goff; and then the challenging approaches nurtured by a younger generation such as Paul Rudolph, Eero Saarinen, Minoru Yamasaki, and Craig Ellwood, to name just a few.

In banishing academic principles, modern architecture's proponents established a new conceptual order defined to a stunning degree by individual will. Many of the movement's leaders espoused purportedly transcendent principles of design - Wright's and LeCorbusier's are among the best known - but these were individually generated, and seldom proved to be creatively used by others unless they were transformed into a new, equally personal manner, as Goff did with Wright's, for example. Furthermore, the fundamental academic notion that principles were immutable, that they do not change over time however varied the expression from one era to another, also was silently discarded in favor of an outlook that encouraged more or less continual change, so that the basic premise of design espoused by one group or generation was, and is, frequently challenged by others. Modern architecture, in short, is very much a relativistic phenomenon.

Modern conceptions of space have certainly affected the structure of settlements patterns since World War II, but many practical factors were at work as well. Too often this landscape is simplistically dismissed as "sprawl," with no effort to understand the forces that have shaped it. The modern metropolitan area is not the product of demons or fools, of conspiracy or vandalism, any more or *any less* than the industrial or pre-industrial city. In all these cases, functions have tended to gravitate where they appear to operate efficiently from their owners' or operators' perspectives. The regional shopping mall, to return to Shopper's World for a moment, flourished not just because ever larger numbers of the middle class were moving ever further from the city center and possessed unprecedented mobility, disposable income, and leisure time. A key part of the equation was that retail districts in many city centers were saturated. They could not expand at a rate commensurate with market growth unless they embarked on prohibitively expensive building programs that would have replaced the core with much denser development. This *has* happened - that is, centralization has continued as a significant thrust -in cases where it has been advantageous to do so, most conspicuously with

financial and certain other kinds of service centers.

On the other hand, decentralization has been a significant factor in urban growth for much longer than many people realize. The demands of space for numerous industrial processes and for nearby worker housing led to a scattering of factory sites in large cities beginning more or less with the advent of the railroad. Industrialization, too, led the rich and middle class to seek other peripheral locations for just as long. To contemporary observers, cities such as Philadelphia or Detroit seemed to have reached epic proportions in their sprawl by the late nineteenth century. That scale, in turn, appeared diminutive compared to growth over the next several decades. The surge that came after World War II was hardly unprecedented then, and, had it not continued to occur, cities would have had to remake themselves, leaving little fabric over fifty years old to preserve.

What did change, of course, were many of the particulars of where things were located and how they were configured. The major cause was the mobility permitted by individually-owned motor vehicles for work and pleasure. These machines not only consume vast amounts of space themselves, they allow us to traverse space in ways never before imaginable. Driving time, not linear distance, has been a standard locational measure since the 1940s. We think little about driving an extra five miles - a few minutes - for shopping, to church, to our home, if we see clear advantages to doing so. A very important factor in this equation is that the car did not so much introduce such choices to us as it allowed us to *retain* some of the sense of spatial openness and freedom of movement associated with many towns, but not with most cities, in the nineteenth century. The modest tract houses of the postwar era, for example, are really incarnations of the modest ones built individually that comprise the vast majority of dwelling units in the great majority of American towns. Shopper's World took the New England green as a conceptual prototype for its mall configuration. The big open spaces around the school, amid the office park, or permeating the apartment complex are latter-day surrogates for being able to see the country from many parts of town and being able to reach one from the other in minutes.

We are not used to thinking of the modern world as having strong ties to the past, as representing continuity as well as change, in part because its differences, its ambient newness, has been so unrelentingly promoted. For this reason, among others, it can be difficult to think of mid-twentieth-century things as "old." What we see, what we think about, is how dissimilar they are to what came before them - how much the glass curtain-wall bank stands out from its neighbors of even thirty years previous; how much the modern house, nearing forty years old, seems unlike a traditional domestic environment; how much the aircraft manufacturing plant seems worlds removed from stereotypical notions of factory. How can environments so strenuously billed as harbingers of a better tomorrow now be considered in the past tense? Is this an admission of broken promises? Has the bank recently failed; the aircraft plant closed? Is the housing tract that was a field of dreams for persons entering the middle class a generation ago now deteriorating into a slum? Or perhaps is it that we still see this world with the critical eye of the present rather than with a sense of detachment? The Urban Renewal Program, after all, was one of the federal behemoths that helped launch the National Historic Preservation Act as a counterforce. How could the Southwest project, as one of that program's penultimate ventures, now be worth a major preservation initiative?

Part of the challenge is for preservationists to think less like critics and more like historians. Most preservationists are bad critics of the built environment, which they cast in simplistic terms, sometimes irresponsibly so. It's all or nothing: the development Godzilla versus the preservation Bambi. But it's not all their fault. Even the most sophisticated critics tend to cast things in black-and-white, indulging in hyperbole along the way. Lewis Mumford did this: Park Avenue was no better than a slum; ye olde New England village was beyond reproach. Ada Louise Huxtable does this: Williamsburg, and preservation in general, begat many of the "evils" of current design and urban development, as I am sure many of you have read. This tack may be a defensible ploy to engage the reader, to get him or her to think about, to discuss, and to debate significant issues. In other cases, it may not be defensible at all; it may amount to intellectual reductionism at its most mischievous. But even under the best of circumstances, the critic's portrayal is not wholly accurate; it is not the way things really are. That is why we have more than critics and commen-

tators; why we have historians to provide a more detached, retrospective view.

Mrs. Huxtable's charges aside, preservationists have done a pretty good job with history. Over the past twenty-five years, they have saved a remarkably broad, diverse swath of the past in terms of type, time, and place. At the outset of that period, preservationists made a major contribution to academic disciplines by demanding a more inclusive scrutiny of the past, by insisting that many more things were significant than the textbooks let on. As a result of preservation, we have a much richer sense of the past in its physical dimension than we had before.

Given this track record, it is rather strange that many preservationists, and by no means just some of the old guard, have conspicuous difficulty coming to grips with the recent past - more difficulty, I think, than many members of the public at large. The problem, I fear, lies not just with the subject matter, but with what's happening to the field as a whole. Overly bureaucratized procedures, combined with a tendency for preservation to be subsumed by fields such as urban revitalization and tourism, which can be of great benefit to, but which should not drive, preservation endeavors, have led to an increasingly formulaic view of the past. In this schema, history is not rich and complex, it is a litany of buzz words, it is one or another "theme." Here I must partially agree with Mrs. Huxtable; preservation is at least in danger of becoming synonymous with the theme park.

Similarly disturbing signs are evident in preservationists' common parlance. Take, for example, the ever more habitual use of the term "historic" to refer to listed properties and of "non-historic" to those that are not so listed, as if "historic" is some kind of breed raised in the darkest recesses of the Department of the Interior. How preposterous. History is not fixed, not finite. Nor are all of our listing programs combined anywhere near completed, even according to what we may view as historically significant at present. The newer the resource, the more such rote categorization is applied. I have heard time and again from preservationists, *paid* preservationists, that little in their respective communities is "historic" because most of its fabric was built after the First World War. Is this just an excuse for doing less work, for having less of a management problem? Not necessarily. A recent newsletter from a state historic preservation office, one well removed from the decadent East, gave lengthy coverage to the local legacy of Modernist buildings, some now well over fifty years old, bemoaning the difficulties of saving them when they are not "historic." Who says they're not historic! I do not know any reputable architectural historian in academe who would entertain such foolishness. Lots of scholarly attention is being given to the mid-twentieth century, to its vernacular as well as it high-style aspects. Why do all these historians devote years to studying "non-historic" material? Preservationists run the risk of losing credibility in the disciplines that are their professional backbone when they succumb to such shallow typecasting.

Preservationists also need to rid themselves of their "style" fetish - the reliance on simplistic categories presented in guides that is antithetical to what is taught in serious programs of history. In these books, a very complicated and elusive subject is reduced to a series of motifs, which in turn tend to become a test of "purity" - again as if the process of design was synonymous with breeding. Anything that doesn't fit these limited categories is immediately suspect, or at best ignored, because preservationists do not know how to deal with it. Many resources from the mid-twentieth century pose problems when this kind of approach is taken - not just the high-art examples where the architect's personal style is such a determining factor, but in vernacular examples as well. I was recently told that a famous middle-class housing tract of the 1950s would never be eligible for the National Register because the architecture conformed to none of the "recognized styles." If such thinking prevails, preservation will render itself irrelevant in short order.

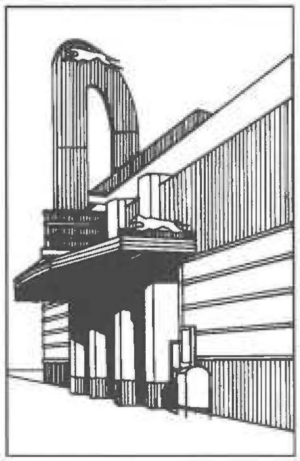
The challenge is great. There is much to save. After World War II, the United States became an international leader in modern architecture. Our legacy of work by a wide range of highly creative designers - of landscapes and interiors as well as of buildings - during the postwar era is probably unmatched by any other single nation. There is an equally formidable inheritance from those not as famous, but whose work nonetheless is of an exceptional standard. Then there is the broad vernacular realm, from which one can take many examples. At no time, past or present, for instance, has such commodious housing been available to persons of moderate means in major metropolitan areas than during the postwar years - not in this country and certainly not anywhere else. All those derisive comments about sprawl, about ticky-tacky,

about inhumane boxes extending to the horizon referred to an absolutely remarkable phenomenon that affected millions of people and may never be duplicated.

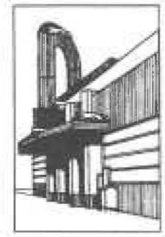
Then there is the highway landscape. Again, there is no comparison elsewhere because nowhere was so much space available and so many consumers able to reach it. The components can be as rich and varied as on Main Street, which itself was once seen as blight, just like the strip is now. The small, family-run motels, the expansive department stores run by national chains, idiosyncratic things cheek-by-jowl with idiomatic ones. Nowhere is evidence of the automobile more emphatically displayed; nowhere is the car's insistent demands on space more clear; nowhere is an environment more attuned to perceptions as they are from behind the steering wheel. The critics hate the strip too, just as they once hated the cities that the preservationists helped rescue.

The challenge is pressing. We cannot afford to squander what has been created during the mid-twentieth century the way we have squandered so much that came before it. We cannot afford not to know what we have. We do not have the luxury of time. Population growth and change, paid mortgages, expended depreciation, expired leases - there are many factors that hasten the threat to the recent past. If we can redirect preservation back more to historical thinking and away from formula, more to historicity and away from theme; if, as we do this, we can become more knowledgeable of, and creative with, strategies in commercial revitalization, housing, tourism, and all the rest so we can affect integration without poor compromises, so that we can more honestly demonstrate the transcendent power of the past on its own terms and not the pliability of the past as a tool of convenience or as a plaything of design; then we can address these challenges well and give preservation the vitality and imagination it will need to flourish in the next century.

RESOURCE EVALUATION



The Significance of the Recent Past



Trends in Recognizing Places for Significance in the Recent Past

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The end of the twentieth century is fast approaching. The rapid pace of events, new achievements in science and technology, and the swiftness of development and change impact us all. Many of us yearn to assess the significance and to identify and preserve the places that are most important in illustrating the events, the people and the design, engineering and technological achievements of the recent past. After all, we wish to leave the record of our times and contributions for our children and future generations.

What kinds of places are Americans recognizing as part of our heritage that have achieved significance in the recent past? The National Register of Historic Places is a good place to begin to find out. Even though the National Register Criteria for Evaluation require a property achieving significance within the past fifty years to be of exceptional importance to qualify, as of the end of 1994, 2,035 such properties were listed. Of these, 464 properties were listed that reflect some aspect of our history since 1950, and 77 of these places exclusively reflect some aspect of our history since 1974. As one might expect, many of these properties are recognized for their extraordinary role in our nation's history; however, approximately one-third are listed for their exceptional importance in community history.

The National Park Service has published *National Register Bulletin 22*[1] to encourage the nomination of recently significant properties, if they are of exceptional importance to a community, a state, or the nation. The *Bulletin's* guidelines suggest how to evaluate whether a property of recent importance is of enduring historic value, but Americans themselves must determine which places are historic and document and nominate them to the National Register when they are comfortable that they are truly worthy. Because listings are entered into the computerized National Register Information System it is possible to identify examples and some trends among the listings recognized for their associations with our history since 1950.

Listings from the recent past can be identified by which of the four National Register criteria they meet and by the areas of significance for which they are documented. All twenty-nine areas of significance are represented by listed properties from the period since 1950. By far the most listings representing the post-1950 period are in the area of architecture. Following behind architecture, the other most represented areas of significance are, in descending order, social history, politics/government, commerce, transportation, and engineering.

A number of places are listed under criterion A for their association with events or patterns of events that have had an extraordinary impact on our recent history. The Fleischmann Atmospherium Planetarium in Reno, Nevada, is one example that was registered in 1994 for its

special role in scientific research and education in Nevada. It was the first planetarium in the nation to feature a 360-degree projector capable of providing horizon-to-horizon images and, through time-lapse photography, show an entire day's weather in a few minutes.[2]

Some events have had such a profound impact on American history that the value of resources associated with them is obvious. Launch Complex 39 at the Kennedy Space Center was listed in the National Register in 1973, not quite four years after July 16, 1969, the day the Apollo 11 lunar landing mission of astronauts Neil A. Armstrong, Edwin E. Aldrin, Jr., and Michael Collins was launched. Congress mandated the Department of Interior to do a theme study to identify and designate National Historic Landmarks related to the space program. The Man in Space theme study, completed in 1984, recommended twenty-four places for designation as National Historic Landmarks, because, according to the theme study, they were the best and most important surviving examples of the resources that reflected Americans' efforts to land a man on the moon, investigate the near earth environment, and to explore the planets and solar system.[3] The theme study found that many of the resources relating to space technology had been destroyed, abandoned or altered, and expressed hope that the twenty-four survivors identified in the study would be preserved to interpret for future generations the early years of the space program. A rich range of resources such as wind tunnels, rocket engine development and testing facilities; rockets; launch pads; Apollo training and hardware, and unmanned spacecraft test facilities; tracking stations; and mission control centers were eventually designated.

The Cold Spring Harbor Laboratory Historic District on Long Island, New York, was listed in 1994 as a facility for original scientific research and for association with several Nobel Prize winners. The laboratory was the preeminent research facility associated with the developments in molecular biology in the 1940s and 1950s. Among the Nobel recipients was Barbara McClintock, who was in residence at Cold Spring for more than fifty years from 1941 until her death in 1992. Other Nobel Prize winners are Max Delbruck, Alfred Hershey and Salvador Luria, leaders of the "phage group," pioneer researchers in molecular genetics whose work led to the discovery of the "double helix" configuration of DNA by James Watson and Francis Crick. Watson and Crick made their first public presentation of this work at Cold Spring in 1953. As former State Historic Preservation Officer Joan K. Davidson noted upon the property's listing, "The development of 20th-century genetics has had a substantial impact on modern life....We use DNA to identify criminals, to pinpoint and correct once-intractable hereditary diseases, to improve crop yield, and to identify new drugs....Its listing in the National Register recognizes the central role Cold Spring Harbor Lab played in the birth and maturation of this science." The nomination documentation supports the exceptional importance of the laboratory with over five pages of bibliographic sources, five pages of annotated selected references, and several testimonial letters from scientists and historians of science.

A place exceptionally important for historic events during the recent past in the area of politics and government is the Campus Center, commonly known as the Student Center, of Alaska Pacific University (formerly Alaska Methodist University) in Anchorage. Designed by Edward Durell Stone and constructed in 1966, the student union building was the site of the Alaska Federation of Natives conference in 1971. At the time of its listing in 1978, the event for which the building attained exceptional importance was less than a decade old. The approximately one billion dollars and forty million acres conveyed to Alaskan Natives by the provisions of the Alaska Native Claims Settlement Act of 1971 were the largest compensation ever paid to Native settlement claims. The student union building dining room housed the three-day meeting of more than 600 Native Alaskan Native delegates following the bill's passage by the United States Senate. The delegates ratified the agreement stipulated in the Act during this meeting, and President Nixon signed the Act on December 18, 1971.

A wide range of places meet National Register criterion B for their association with individuals who have made exceptional contributions to recent history. The Charlie Parker House in Manhattan is one such place. From 1950 until 1954, this rowhouse was the home of Charlie "Bird" Parker, legendary jazz saxophonist credited with creating "be-bop," a major departure from the Swing music prominent in the 1930s. By the time Parker moved to the basement apartment of this house he was a well known jazz master and prominent recording artist. He lived here from 1950 to 1954, just a

few months before his untimely death in March, 1955, at the age of thirty-four. The bibliography in the nomination contains no less than nineteen citations attesting to how widely his worth as a jazz master has been recognized by scholars and music lovers.

In 1953, Ernest Gruening, Territorial Governor of Alaska from 1939 to 1953, moved to a cabin outside of Juneau. There, he wrote his book, *The State of Alaska*, in 1954, a number of articles for national magazines and newspapers, and numerous letters promoting statehood for Alaska. Gruening was known as one of the chief architects of Alaska statehood, and Alaskans elected him as one of their first U.S. senators when Alaska was granted statehood in 1959.

Places associated with presidents have been recognized as well for their historic relationships with those individuals elected to this internationally significant office. President Clinton's birthplace was listed in 1994. To quote from the nomination, "Virginia Cassidy was three-months pregnant with their first child when her husband died after his car veered off a rain-slicked back road during a business trip." She gave birth to William Jefferson Clinton 3rd on August 19, 1946, while residing in this modest house with her parents. Although Clinton only lived there until 1950, the State Historic Preservation Office nominated this house to the National Register as "the single property most significantly and exclusively associated with President Bill Clinton's humble beginnings, the inner strength he learned from his mother, and the dedication to purpose that has sustained him throughout his distinguished political career."

The Dealey Plaza Historic District in Dallas was designated a National Historic Landmark in October 1993, as the site of President John F. Kennedy's assassination almost thirty years earlier on November 22, 1963. The NHL documentation discusses the international importance of Kennedy's assassination and the extremely emotional issues that revolve around the historic event Dealey Plaza commemorates, the controversies surrounding the assassination investigation, and those issues associated with the property's current designation and preservation.

The ranch house in Silver Spring, Maryland, designed and constructed by biologist, naturalist, writer and poet Rachel Carson as her residence in 1956, was designated a National Historic Landmark in 1991. Carson resided here from 1956 until her death in 1964. Here she wrote the highly acclaimed *Silent Spring*, which put her at the forefront of American ecology movement advocacy. The book drew popular attention to the poisoning of the earth and the endangerment of public safety by the indiscriminate use of modern chemicals and pesticides. The reaction to the book was heated, with the chemical industry spending large sums to discredit Carson's findings as the ravings of a "hysterical woman who wanted to turn the earth over to the insects." However, President Kennedy set up a special panel of his Science Advisory Committee to study the problem. Its report vindicated Carson's findings and ultimately led to the founding of the Environmental Protection Agency and the eventual banning of DDT.

Andalusia, a 547-acre farm outside of Milledgeville in Baldwin, County, Georgia, was the home of acclaimed novelist and short story writer Mary Flannery O'Connor (1924-1964) during the last thirteen years of her productive life. She moved here with her widowed mother in 1951 after being diagnosed with lupus and died here thirteen years later. The rural landscape of Andalusia and the peafowl she raised there were prominently featured in her writings. Characterized as a preeminent figure among the generation of Southern writers after Faulkner, she earned national writing awards, financial grants, and critical acclaim for her short stories. The farm is listed solely for its historic associations with this exceptionally significant female writer.

As with the National Register as a whole, most listings with recent significance occur under criterion C because the properties are important examples of a building type, architectural style, historic period, or method of construction. Four houses and an office building were recently listed as part of the Early Modern Architecture Associated with the North Carolina School of Design Multiple Property Submission. This unique group of buildings dating from 1950 to 1968 is significant as the work of a small group of highly-talented architects at one of the best-known American schools of design in the early post-war period. The earliest of these houses exhibit for the first time in North Carolina the strong influence of Frank Lloyd Wright's residential designs of the 1930s. The Matsumoto and Small Houses and the Small Office Building incorporate for the first time in the state the

aesthetic concepts developed by Mies van der Rohe. While buildings by both Wright and Mies have been registered for some time, a generation of later buildings that were influenced by their designs are now being listed.

Works of many master architects are among the recent listings under criterion C. The Sanderling Beach Club is the work of Paul Rudolph, one of Walter Gropius' students at the Harvard School of Architecture, who became internationally famous for his modernist architecture and as Chairman of the School of Architecture at Yale University. These five cabanas are an American interpretation of the modern movement and the International Style adapted to a subtropical climate. As the nomination explains, "The innovative design of the Sanderling Beach Club cabanas, using a vaulted plywood roof system, has been recognized as highly original and significant by numerous scholars and has been published extensively since their construction in 1952."

The Trenton Jewish Community Center Bath House and Day Camp, in Trenton, New Jersey, not only is valued as an early work (1955-57) of the internationally renowned architect Louis I. Kahn, but it also has transcendent importance as the prototype for the architectural concepts and images that he later developed in larger and grander buildings. The Bath House is celebrated as Kahn's seminal work, the crystallization of his solution to the integration of structure, function and aesthetics. Kahn himself recognized the importance of the Bath House design. After its completion, he told an associate that he never again had to look to another architect for inspiration. Because of its well documented exceptional importance as the embodiment of Kahn's personal architectural credo, the Bath House was listed in the National Register when it was only 29 years old.

The Carpenter Center for the Visual Arts at Harvard University was listed in the National Register in 1978, only 15 years after its completion in 1963. As the only building on the North American continent designed by Le Corbusier (Charles Edouard Jeanneret), its merit is unquestionable, and the history of its construction is well documented, because all sketches and studies have been preserved. At the time of its listing, the building had already been the topic of numerous scholarly articles, Masters and Ph.D. theses, and a comprehensive monograph by noted architectural historians.

Other exceptional architecture is listed for innovations in building technology. The Onondaga County War Memorial, in Syracuse, New York, designed and constructed in 1949-51 by the Syracuse architectural firm of Edgarton & Edgarton and the engineering firm of Amman & Whitney, is listed for its exceptional architectural and engineering importance in the city's history. The building is a "living memorial" erected to commemorate duty in the armed services in the post-World War II era. Rendered in concrete thin-shell vault construction, the auditorium building is equally important as a precedent-setting example of this building technique. It was entered in the National Register in 1988.

In 1956 the Solar Building in Albuquerque, New Mexico, was highly publicized in technical and popular publications, where it was generally praised as the world's first solar-heated commercial building. These publications included *Architectural Record, Progressive Architecture, Architectural Forum, Life* and *Fortune.* By the mid-1950s, active solar systems were still considered experimental, and applications were mostly "in the realm of theory and applied research" (*Progressive Architecture*, March 1957). The *Architectural Record* cited the Solar Building as marking an advance to "actual every-day commercial operation" (December 1956). The National Science Foundation (1974), the *New Mexico Professional Engineer* (1975), and Architectural Record Books' *Energy Efficient Buildings* (1980) later recognized the unique contribution the Solar Building has made to modern architectural and mechanical design and to the continuing development of solar energy. The nomination puts the building in context with others of its type and states that the Solar Building is one of only a few examples of early solar technology that have survived. Of approximately 138 solar buildings identified in a 1975 survey, nearly 100 were built after 1970, and most are residential. A later book identifies the Solar Building as the only pre-1976 example of a solar commercial building. These kinds of references affirm the impact of the Solar Building at its time of construction and the building's relative rarity at the time of its nomination in 1989, thereby meeting the test of substantiating its exceptional importance. The National Register nomination makes an excellent case for the building's extraordinary merit.

The "Wrightian" architectural mode represents the largest number of modern architectural works listed for this period. The Iowa State

Historic Preservation Officer has nominated an excellent multiple property submission for Iowa Usonian Houses by Frank Lloyd Wright, 1945-1960. The description of the characteristics of Wright's Usonian designs and the significance summary in the historic context section, based on the Masters thesis of architecture student Chery Peterson, can be used to help justify the importance of Usonian buildings anywhere. According to the well documented nominations, the Robert Sunday House (1955) in Marshalltown and the Paul Trier House (1956) in Johnston are the two most recent examples of the seven Usonian houses nominated under the multiple property submission. These houses are of masonry construction, have flat roofs with wide, denticulated fascia, and Wright's signature Usonian wood "shutters," the perforated boards that cover some narrow windows. They take characteristics of their design from the 1953 Usonian Exhibition House constructed on the later site of the Wright-designed Solomon R. Guggenheim Museum in New York City. Built in 1954, the virtually unaltered Gerald B. and Beverley Tonkens House in Cincinatti, Ohio, and Broad Margin in Greenville, South Carolina, are two additional very fine examples of this house type that are also registered.

The Annunciation Greek Orthodox Church, in Wauwatosa, Wisconsin, was one of Frank Lloyd Wright's last commissions when it was designed in 1959-61. It was listed in the National Register on December 19, 1974, only thirteen years after its completion. The Church represents Wright's later period, which culminated in his last major work, the Administration Building/Hall of Justice complex of the Marin County Civic Center. The Civic Center is the largest public project constructed during Wright's career and the only one for a governmental client. Included in the project is a U.S. Post Office, Wright's only federal commission. Not surprisingly, Wright was the first architect to be honored on a postage stamp. The complex is Wright's crowning glory, the culmination of his theories of organic architecture, which he defined and redefined from the 1930s to the end of his life on 9 April 1959. The complex was posthumously dedicated in 1960. The complex was designated a National Historic Landmark and listed in the National Register in 1991.

The impact of the relatively rare International Style on the American landscape is reflected by a handful of listings. The Lever House in New York City was finished in 1952 and designed by Skidmore, Owings and Merrill's chief designer Gordon Bunshaft. The building was listed in the National Register just thirty-one years after its completion in recognition of its pivotal importance in the history of American architecture. This building is one of the first corporate expressions of the International Style in post-World War II America by a prominent architectural firm, and one of the first projects to take advantage of New York City's zoning law change allowing the erection of an unbroken rectangular slab with an open plaza below. Its construction signaled the transformation of Park Avenue from a chic residential area to the city's most prestigious corporate location.

The Arkansas Power & Light Building in Little Rock, Arkansas, was listed in 1992 as an exceptionally notable corporate example of the International Style in the city. Designed by Fred Arnold and the architectural firm of Wittenburg, Deloney and Davidson, it was constructed between 1955 and 1959 as the city's first large office building executed in the International Style. Still owned and maintained by its original occupants, the building remains in very good condition in a virtually unaltered state.

Examples of other modes of Modernist design are included in the National Register as well. The Currie House, a small residence constructed in Blacksburg, Virginia, in 1960, was listed in 1994 for its exceptional importance as one of a few modern, architect-designed houses in the state from the period. Architect Leonard Currie, Head of the Architecture School at Virginia Tech and a student and colleague of both Marcel Breuer and Walter Gropius, designed his modest contemporary residence to purposely counter the prevailing trend in Virginia, which favored derivative, pseudo-Colonial styles. At a time when the state was noted for its scarcity of modern architecture, the Currie House was immediately recognized by the American Institute of Architects, which awarded the design the First Honor Award for Homes in 1962. This judgement was reaffirmed by the Virginia Society of the AIA, which awarded the Currie House its "Test of Time" Award in 1982.

The Fleischmann Atmospherium Planetarium is the only example representing the emerging definition of a Populuxe mode of design. Thomas Hine's book *Populuxe* has provided some context for evaluating examples of the Populuxe design attributes of the 1950s and 1960s. According to Hine, Populuxe is characterized by space-

age designs that depict motion, such as boomerangs, flying saucers, parabolas, and atoms that reflects the optimism, affluence, and mobility of American society a decade after the end of World War II.

A rich variety of places have played important roles in American social history, usually over a considerable period of time beginning earlier and extending into the recent past. The new book cosponsored by the National Park Service, the National Conference of State Historic Preservation Officers and the National Trust's Preservation Press, *African American Historic Places*, identifies over eight hundred places associated with the African American experience. Of these, fifty properties are recognized for their exceptional significance since 1950. Twenty-four of these listed properties tell the story of the phenomenal impact of the Civil Rights Movement in the United States. Perhaps the best known example is that of the Martin Luther King, Jr., National Historic Site and Preservation District, which was designated as a unit of the National Park system by Congress in 1980, just twelve years after Dr. King's death.

The effects of the national Civil Rights Movement are reflected in the local efforts of places like Tuscaloosa, Alabama. The First African Baptist Church in Tuscaloosa was listed in 1988 with a period of significance through 1964 for its exceptional importance within the city. Constructed in 1907, the church called one of its most celebrated ministers to serve in 1963 - Reverend T.Y. Rogers, Jr. The social impact of Rogers' call to Tuscaloosa became evident as early as his installation, which was conducted by Dr. Martin Luther King, Jr. Rogers was the chief spokesman for the Tuscaloosa Citizens for Action Committee and the key orchestrator of the local civil rights movement. Rogers and First African congregants played a crucial role in local pacifist demonstrations against discriminatory practices, and the building served as a refuge during these turbulent times.

The Shelley House located in St. Louis, Missouri, was also listed in 1988 because a racial restrictive covenant attached to it was the subject of a 1948 debate before the United States Supreme Court challenging the legality of private agreements among property owners written to restrict property ownership to Caucasians only. The Supreme Court's landmark decision in the case of *Shelley v. Kraemer, 334 US*, led to unprecedented change in the legal basis of American residential real estate practices by broadening the principle of equal access to housing for all Americans. In turn, the increased housing opportunities spurred substantial shifts in the housing patterns of ethnic minorities throughout the country in the succeeding decades.

The Bethany Baptist Church was listed in 1989 under criteria A, B and C for its historic and architectural significance to Newark, New Jersey. Its exceptional importance in the area of politics and government is for historic associations with Reverend Dr. William Preston Hayes, Bethany's pastor from 1932 to 1961, and Pastor Emeritus from 1961 until his death in 1963. Hayes was a noted leader in public housing, having served on the Newark Housing Authority from 1942-53, including acting as chairman for two years. In 1954, a singular honor was accorded Dr. Hayes when the Public Housing Administration in Washington, DC, permitted for the first time, a housing project, known as the Hayes Homes in Newark, to be named for a living person.

In 1954 the United States Supreme Court ruled that racially "separate educational facilities are inherently unequal." Striking down the 1896 *Plessy v. Ferguson* decision that had provided States the right to maintain "separate but equal" public facilities, the 1954 *Brown v. Board of Education* ruling had a profound social and ideological impact and it forced desegregation of public schools in the twenty-one states with segregated classrooms. The case was precipitated by the refusal of the all-white Sumner Elementary School to admit Linda Brown, a black student. Brown had been forced to travel considerable distance to Monroe Elementary School, Topeka's black elementary school, even though Sumner was nearby. Congress affirmed the exceptional importance of this Supreme Court decision by designating the Brown v. Board of Education National Historic Site as a unit of the National Park system in 1993.

The Moulin Rouge Hotel in Las Vegas, Nevada, opened on May 24, 1955, as the city's first interracial entertainment facility. On March 26, 1960, it was the site of a meeting attended by members of the local chapter of the National Association of the Advancement of Colored People, community business leaders, and political figures. This meeting led to an agreement on the part of most Las Vegas hotel owners to end segregation of the "Strip" and the commercial district. The hotel was listed in 1992 in

recognition of the exceptional impact of these events in the city's history.

The Holy Cross Lithuanian Church, nominated to the National Register as part of the European Ethnic Communities, Dayton, Ohio, Multiple Property Submission houses one of five ethnic parishes in Dayton, which document the immigration of Eastern Europeans into the city. Originally constructed beginning in 1912, the Church's current appearance is the result of a 1963-1964 remodeling. The remodeled church, designed by John Mulokas, a Lithuanian architect, and executed primarily by Lithuanian craftsmen, is a blend of Lithuanian folk art and design honoring the many churches closed by the Soviet Union. One of only three Lithuanian ethnic parishes in Ohio (according to the nomination), the Holy Cross Parish with its clubs and societies has been the center of religious, cultural and patriotic activity for the Lithuanians of Dayton and the surrounding area. At the time the church was listed in 1991 it was a traditional cultural property that still continued to preserve Lithuanian culture and language.

Icons of recent popular culture are recognized in diverse listings related to the movie, music and television industries. As the National Register nomination suggests, an African work boat now moored in Key Largo, Florida, was as much a star of the 1951 movie classic *The African Queen* as were Humphrey Bogart and Katharine Hepburn. The nomination explains the development of the movie industry and describes how in the late 1940s the industry responded to the growing competition from the emerging television industry by turning to popular stories, such as the novel by C.S. Forester upon which this movie is based. According to the nomination, director John Huston strove for the greatest possible authenticity of setting in an effort to continue to lure the public to the theater. The 1912 motor launch working on the waters of Lake Albert and the Victoria Nile River in Uganda was renamed the *African Queen* and used in numerous scenes in the movie as it was filmed in both the Belgian Congo and on Lake Albert and the Victoria Nile River. At one point, she even sank at her moorings, and it took five days to raise her. The *African Queen* won several Academy Awards and is well recognized as a classic of American motion picture art.

Elvis Presley bought Graceland in 1957 early in his career in music and film and continued to live there until his death in 1977. According to the nomination, when Graceland was listed in 1991 between five hundred thousand and six hundred thousand people visited his home and grave on the estate each year. At the time, Paul Harvey acknowledged the listing of Graceland in the National Register on his radio show and made a tongue-in-cheek comparison with Mt. Vernon and Monticello, two of the other historic houses that receive large numbers of visitors.

Initially constructed in 1947-1948, as a model for television station design, the WFIL Studio in Philadelphia was expanded in 1952 to consolidate the radio and television operations of WFIL in one location. In that same year, a local record and dance program called *Bandstand* began televising from the studio's newly completed Studio B. The local popularity of the program was so great that in 1957, the year after Dick Clark became the host, the program joined the national ABC network as *American Bandstand.* During the years the show remained in Philadelphia, from 1952-1963, it had an overwhelming and sustained impact on the future of rock and roll music and on the popular culture of the Baby Boom generation. As one of only a few early television broadcast facilities designed specifically for that medium, and as the home of *American Bandstand* during the program's early and most influential years, the studio was listed in 1986 for its exceptional distinction in American entertainment.

Sometimes a threat to a property will force a community to assess its value far sooner than it would otherwise. The Whitney Museum has one of the latest construction dates of any building recognized by the National Register, 1963-1964. When the original Marcel Breuer design of the Whitney was threatened by plans for a massive new addition, the citizens of New York mounted a campaign to get it listed. The nomination documentation includes 124 endnotes, an extensive bibliography, and numerous testimonials from noted scholars attesting to the exceptional importance of the building in the development of Modern American architecture. The privately-owned building is not listed in the National Register because of owner objection, yet it remains one of the youngest buildings determined eligible for its exceptional architectural significance.

Another internationally acclaimed masterpiece of American architectural design of the Modern movement, Dulles International Airport in Chantilly, Virginia, was determined eligible for

listing in the National Register in 1978 because the Federal Aviation Administration needed to evaluate its eligibility in order to plan responsibly for the airport's expansion. Dulles architect Eero Saarinen was awarded the American Institute of Architects' Gold Medal in 1962, shortly after the airport's completion. The Dulles terminal was instantly regarded as a preeminently important building by the architectural community. The character-defining features of the airport are being considered in the management and current expansion of this facility.

Two properties that the National Register recently evaluated illustrate how the Register functions in resolving controversies concerning whether a place related to the recent past can be judged historic, at least so far as eligibility for listing is concerned. A nomination was proposed for the Stuart Company Plant and Office Building in Pasadena, California, claiming the building's exceptional importance under criterion C in the area of architecture. The State of California agreed and submitted the nomination for a determination of eligibility since the private owner, supported by some public officials, objected to its listing in the National Register. This 1958 office and manufacturing complex is a prototypical, style-defining example of early Neo-Formalist design by architect Edward Durell Stone. During the 1950s Stone led a growing revolt against the stark lines and rigid formalism of the International Style by reintroducing decorative materials and ornamentation into his modernist designs through such features as ornamental grilles and screen walls. The commission for the Stuart complex represented one of Stone's first opportunities to fully realize his new design approach in this country. The industrial complex and its distinctive design were widely publicized and acclaimed in popular and professional journals when originally constructed. The American Institute of Architects cited the building as one of the five best designs for 1958 and awarded the complex a National First Honor award, and it became a much imitated model for other Neo-Formalist designers. The nomination provides substantial documentation that reveals Stone's significant influence on American architecture in general and on California architecture, where Neo-Formalism gained wide acceptance and imitation. Accompanying the nomination is supporting documentation from highly respected scholars with expertise in twentieth-century architectural history and historic preservation. In addition, authoritative sources recognize Stone's importance in architectural history and support the evaluation of the Stuart Company property as an exceptionally significant design from the period.[4]

In contrast, the case for significance was unsubstantiated in an appeal by several citizens of the State Historic Preservation Officer's decision not to nominate a 1960s convention center to the National Register, because in her judgement it does not meet the National Register criteria. The city in which the building is located, a Certified Local Government, concurred with the State that the building is not eligible. The nomination documentation makes the claim that the building, completed in 1968, is a distinguished design in the Expressionist architectural style; is significant for engineering as an example of long-span, post-tensioned concrete construction techniques; and is the work of an important local architectural firm and essentially the only architects in the city specializing in modern architecture. The Keeper of the National Register denied the appeal because the nomination did not demonstrate the perspective necessary to establish exceptional importance within any of these contexts. The nomination mentions such recognized Expressionist masterpieces as Dulles Airport, Ingalls Hockey Rink, Ronchamp Chapel, and the Sydney Opera House. It does not, however, evaluate the subject building in relation to these buildings or to any Expressionist designs locally, regionally, or nationally.

Although the bibliography includes a number of articles about the construction of the building, the building itself did not receive the broad coverage in architectural journals that is usually needed to justify exceptional importance for architecture, nor does it appear to have been recognized in more recent architectural history scholarship. The documentation does not indicate how rare post-tensioned shell construction techniques were at the time the building was constructed, nor why these techniques would be exceptionally significant. The nomination claims that the building was reportedly the largest column-free space ever constructed, but little is documented about how the building compares with other long-span designs of the period. The National Register staff was also advised that the building's architects were still practicing so that it is not possible to judge the building within the body of their work. The National Park Service discourages the nomination of properties associated with living archi-

tects, so that the National Register does not appear to endorse their work.

The pace of development in the United States has resulted in the destruction of much of the historic fabric that documents the impact of the automobile on our culture. In response to these threats, various constituency groups have organized. Preservation advocates have formed organizations such as the Society for Commercial Archeology that have provided leadership in documenting places from the recent past that are fast disappearing from the American landscape.

New Mexico has been a leader in surveying and nominating places associated with US Route 66, and the multiple property submission historic context documentation substantiates the exceptional importance of the road in the State up to the passage of the Interstate Highway Act of 1956. Recently Congress directed the National Park Service to do a study of Route 66 and the Lincoln Highway Association was re-established in 1992, manifestations of the broad national interest in this subject. Examples of automobile-related properties such as diners, McDonald's, tourist courts, motels, road segments, tourist attractions, shopping centers and gas stations have been recognized by the National Register. They range from a Frank Lloyd Wright-designed gas station to Mom and Pop businesses erected along the roadside by anonymous designers. While a few years ago these types of properties of the recent past were often hardly given a second thought as far as eligibility for the National Register is concerned, as scholarship and historic preservation advocacy have progressed so has their institutionalized appreciation in some instances.

Another highly threatened group of properties are those associated with the Cold War. The Department of Defense has just now completed a historic context document to assist in evaluating historic resources related to World War II, and the National Register lists a number of World War II properties including quonset huts in Michigan and Rhode Island, the Pentagon, several Japanese internment camps, and ships, to name a few. Now Congress has asked the Department of Defense to study the history of the Cold War as part of its Legacy program. As we destroy the missiles and dismantle the facilities that tell us about how we prepared to defend ourselves against the former Soviet Union and its allies we must quickly and reasonably determine not only what is significant but which of these irreplaceable artifacts of the post-war era should be preserved. So far, only a few of these places have been registered. Now that much of the documentation is being declassified, the Department of Defense is completing the preparation of a historic context document to guide us in understanding the Cold War and in identifying its significant properties, and not a moment too soon given the rate at which they are disappearing. We need to preserve at least some of these places if we are to understand the impact of the Cold War on public policy and on our nation's psyche.

The determination that a place is of historic value is based on a growing consensus among the people about its lasting worth. The federal government does not dictate when a place becomes historic, but merely recognizes historicity through listing in the National Register. Occasionally, the impact of our history is so obvious that there is almost immediate recognition of value, as in the case of Man in Space and the Civil Rights Movement. More often, contemporary accounts and research and documentation by scholars over time establish the context within the framework of American history that is essential in building a consensus that recent events, persons, designs, or information are of such extraordinary importance that places associated with them are of historic value. The wide range of research and writings about master architects like Frank Lloyd Wright, Mies van der Rohe, Walter Gropius, and Louis Kahn clearly document what their designs have meant to American architecture. Recognition by national organizations such as the American Institute of Architects, the Society for Commercial Archeology, the Lincoln Highway Association, and others, as well as media coverage, are sometimes key.

The historic preservation movement plays a singularly important role in the documentation effort and in raising public consciousness, especially when rare and threatened places are at stake. Research and documentation about how the automobile has changed our history and surveys to identify the places that illustrate this impact initiated by preservation advocates have been critical steps necessary to establish significance in the public mind. Now in states like New Mexico places associated with the use of the automobile are widely understood by the public as worthy of preservation for education

and tourism.

National Register listings and determinations of eligibility reflect scholarship and advocacy in some aspects of our history and their dearth in others. The National Register appeals and determinations of eligibility procedures assist in preservation planning by adjudicating disputes about significance, because both those who claim significance and those who dispute it must thoroughly document their cases. The tests for proving exceptional importance, like the National Register criteria, are relatively broad and can be flexibly applied, but the evidence that a place has historic value is found in the persuasiveness of the documentation presented by members of the public demonstrating that they recognize a place as truly historic.

Notes

[1] W. Ray Luce and Marcella Sherfy, *National Register Bulletin 22: Guidelines for Evaluating and Nominating Properties That Have Achieved Significance Within the Last Fifty Years*, revised edition (Washington, DC: US Department of the Interior, National Park Service, Interagency Resources Division, 1989).

[2] Unless otherwise noted all information regarding properties contained in this paper is derived directly from National Register or National Historic Landmark documentation.

[3] Harry A. Butowsky, *Man In Space National Historic Landmark Theme Study*, (Washington, DC: US Department of the Interior, National Park Service, 1984).

[4] *American Architecture*, by Marcus Whiffen and Frederick Koeper (Volume 2: 1860-1976) cites the Stuart Pharmaceutical Company as one of Stone's four most influential buildings and includes a photograph of the property, as does G.E. Kidder Smith's *A Pictorial History of Architecture in America*.

Sources

For further information or to obtain a copy of any of these National Register (NR) nominations, please contact the National Register Reference Desk at (202) 343-9559. For further information or to obtain a copy of National Historic Landmarks (NHL) documentation, please contact the History Division, National Park Service, at (202) 343-8174.

Fleischmann Atmospherium Planetarium, Reno, Washoe County, Nevada; prepared by Harold Housley and Julie Nicoletta. NR

Launch Complex 39, Titusville vicinity, Brevard County, Florida; prepared by George M. Hawkins. NR

Cold Spring Harbor Laboratory Historic District, Long Island, Nassau County, New York; prepared by Elizabeth L. Watson, Nathan Comfort, and Kathleen LaFrank.

Campus Center, Anchorage Borough-Census Area, Arkansas; prepared by Lydia L. Hays and Michael S. Kennedy. NR

Charlie Parker Residence, New York, New York County, New York; prepared by Jeffrey Baumoel and Peter D. Shaver. NR

Ernest Gruening Cabin, Juneau Borough-Census Area, Arkansas; prepared by Sylvia Elliott. NR

Bill Clinton Birthplace, Hope, Hempstead County, Arkansas; prepared by Kenneth Story. NR

Dealey Plaza Historic District, Dallas, Dallas County, Texas; prepared by Ms. Conover Hunt and James H. Charleton. NHL

Rachel Carson House, Silver Spring, Montgomery County, Maryland; prepared by Page Putnam Miller, Jill Topolski, and Vernon Horn. NHL

Andalusia, Milledgeville vicinity, Baldwin County, Georgia; prepared by Steve Hanson. NR

Early Modern Architecture Associated with North Carolina School of Design MPS, North Carolina; prepared by David R. Black. NR

Sanderling Beach Club, Sarasota, Sarasota County, Florida; prepared by Becky Spain Schwartz, Daniel Delahaye, and Sherry Piland. NR

Trenton Jewish Community Center Bath House and Day Camp, Trenton, Mercer County, New Jersey; prepared by Susan Solomon, Lydia Soo, and Peter Pressman. NR

Carpenter Center for the Visual Arts, Cambridge, Middlesex County, Massachusetts; prepared by Robert G. Gardner, Eduard F. Sekler, and Joseph R. Orfant. NR

Onondaga County War Memorial, Syracuse, Onondaga County, New York; prepared by Michael A. Tomlan. NR

Solar Building, Albuquerque, Bernalillo County, New Mexico; prepared by Mary Davis and Lynn Bridgers. NR

Robert Sunday House and *Paul Trier House* in *Iowa Usonian Houses by Frank Lloyd Wright, 1945-60 MPS*; prepared by Chery Peterson and Ralph J. Christian. NR

Gerald B. and Beverley Tonkens House, Cincinatti, Hamilton County, Ohio; prepared by Sarajane King. NR

Broad Margin, Greenville, Greenville County, South Carolina; prepared by Roy Palmer, Georgianna Graham, and Kappy McNulty. NR

Annunciation Greek Orthodox Church, Wauwatosa, Milwaukee County, Wisconsin; prepared by Mary Ellen Wietczykowski. NR

Marin County Civic Center, San Rafael, Marin County, California; prepared by Sally B. Woodbridge. NHL

Lever House, New York, New York County, New York; prepared by Virginia Kurshan. NR

Arkansas Power & Light Building, Little Rock, Pulaski County, Arkansas; prepared by Kenneth Story. NR

Currie House, Blacksburg, Montgomery County, Virginia; prepared by Sarah Shields Driggs. NR

Martin Luther King, Jr., National Historic Site and Preservation District, Atlanta, Fulton County, Georgia; prepared by Robert W. Blythe, Maureen A. Carroll, and Steven Moffson. NR

First African Baptist Church, Tuscaloosa, Tuscaloosa County, Alabama; prepared by Betsy Hayslip and Shirley Qualls Range. NR

Shelley House, St. Louis (Independent city), Missouri; prepared by Margaret Bush Wilson. NHL

Bethany Baptist Church, Newark, New Jersey; prepared by Ulana D. Zakalak. NR

Brown v. Board of Education National Historic Site, see *Sumner and Monroe Elementary Schools*, Topeka, Shawnee County, Kansas; prepared by Martha Hagedorn-Krass and Harry A. Butowsky. NHL

Moulin Rouge Hotel, Las Vegas, Clark County, Nevada; prepared by Michelle McFadden and Frank Wright. NR

Holy Cross Lithuanian Roman Catholic Church (in *European Ethnic Communities, Dayton, Ohio, MPS*); prepared by Claudia Watson. NR

African Queen, Key Largo, Monroe County, Florida; prepared by Rickey Hendricks and W.N. Thurston. NR

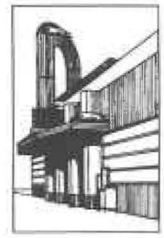
Graceland, Memphis, Shelby County, Tennessee; prepared by Jennifer M. Tucker. NR

WFIL Studio, Philadelphia, Philadelphia County, Pennsylvania; prepared by Susan Shearer. NR

The Whitney Museum, New York, New York County, New York; prepared by Andrew S. Dolkart and Merrill Hesch. NR

Dulles International Airport Terminal, Chantilly, Loudon, and Fairfax Counties, Virginia; submitted by DOT-FAA. NR

Stuart Company Plant and Office Building, Pasadena, Los Angeles County, California; prepared by Leonard M. Kliwinski and Alan Hess. NR



Kent State, White Castles and Subdivisions: Evaluating the Recent Past

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One of the most important decisions made to implement the fledgling National Register of Historic Places was the inclusion of a moving fifty-year period for eligibility rather than a fixed date used by many previous local historic preservation ordinances. This provision has allowed an orderly examination of the recent past in a country whose history has been dominated by change.

It is instructive to realize the distance we have traveled. When the National Historic Preservation Act was passed in 1966, the fifty year guideline encouraged evaluations of places constructed in 1916 or before. We have thus traveled to the end of World War I, through the "Roaring Twenties," the Great Depression, and through the Second World War. We are now actively evaluating themes such as the Cold War, the Civil Rights Movement, the Space Race, and the impact of the automobile on America, which were current when the act was passed.

This journey through the years has been accompanied by an expansion of the resource types we examined as we sought the meaning of "local significance." We no longer look just at the industrialist's mansion on the hill, but also evaluate the associated industrial buildings and the worker's housing. Plantation slave quarters have been rediscovered, and homes associated with significant individuals now include more than white males prominent in politics or the military.

This expansion has elevated several questions: "What does it mean to be worthy of Preservation?" "How do we deal with property types that are in a constant state of change?" "If we include everything do we risk diluting the National Register?" and "How do we ensure that our evaluation of our past, particularly the recent past, includes all significant themes from our heritage and not just those that are currently 'politically correct'?" These are important questions that must be asked as we evaluate the recent past.

We need to examine the recent past as part of a larger preservation philosophy. The National Historic Preservation Act of 1966 declares that "the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people."[1] If the historical foundations of our nation are to give us that orientation, they must be broad enough to include places we are proud of as well as places we would rather forget. This must include not only obvious sites, but sites that are associated with less studied themes such as agriculture, labor and industry, and even despicable threads of our history such as crime, the Ku Klux Klan and Nazi activities.

In doing this, we must also recognize that the National Register criteria are designed to locate places "worthy of preservation." Places worthy of preservation should provide meaning, orientation, use, or beauty in the lives of American citizens.

As the fifty-year period enters the post-World War II period, we begin a period of great opportunity: the opportunity to examine new categories of resources - an opportunity that has been more limited for the last few years. This can be an exciting experience, but one that brings pitfalls and problems, as well, as we evaluate places that are not ordinarily seen as

historic, and as groups use the National Register as a tool in their quest for legitimacy - their place in history - in a way, their opportunity for immortality.

The periods we have most recently examined, the Great Depression and World War II, were remarkably distinct periods with comparatively clear starting and ending points and a unusual degree of unity. The post-World War II era has some distinct threads such as the Civil Rights movement, the Space Race, and even the Cold War, with fairly clear beginning and ending points. Many other themes from the period continue into the present, making evaluation more difficult.

Some buildings are easily recognizable as significant almost as soon as they are constructed, and will likely meet the exceptional significance criterion for properties less then fifty years old. In Columbus, Ohio, the Wexner Center for the Arts at The Ohio State University is such a structure. A pioneering Deconstructionist building, it was the featured building in an issue of *Progressive Architecture*.[2] Other structures built at the same time may be much harder to evaluate. While they may not be recognized as particularly important when constructed, their significance may become apparent later.

One of the fundamental problems in evaluating the recent past is that many, if not most of its building types, structures, and styles are not viewed as historic. Additionally, as the American population ages, it will become more likely that potential historic places will be questioned by individuals who say "I remember that event, person, or construction project, so how can it be historic?" Many preservationists saw and still see shopping malls, fast food restaurants, and suburbs as blights upon the landscape, with little or no redeeming social value. Some of these preservationists now find themselves struggling to understand that some of these same structures may be historic, and in some cases find themselves fighting to preserve the very developments they had sought to prevent. Similarly, recently discarded architectural styles may be the most criticized and rejected and are often in great danger. Such styles no longer have the support of the theoretical practitioners and are still considered suspect by those who saw them as threatening historic styles. We must, for example, be careful to examine International Style buildings so that significant ones are not altered or demolished before they are appreciated again.

This conflict over what is significant can be even more complicated if the evaluation of resources pits preservation disciplines against one another. There may be, for example, structures or treatments that are historically significant and ugly. Preservationists have long decried the "defacing" of Main Street during the 1950s and 1960s. As a movement, we have worked hard to remove these "inappropriate" alterations. As we approach the fifty-year anniversary of these desecrations we may find that some, while they are visually jarring, may indeed be historically significant. The covering of older buildings with screens, grills and siding is one of the most visible manifestations of contemporary thought that saw old buildings as an obstacle to the ideas of progress and newness. Thus, coverings became the way to achieve that ideal when you could not afford to demolish and build a new building. Is this "defacing" of American downtowns a rapidly disappearing historical artifact that needs to be examined for its historical significance despite its obvious visual limitations? Such places will need additional examination to determine whether they are worthy of preservation.

A second fundamental problem with recent resources is that accelerating rates of change insure that some types of resources will not last fifty years. How do we deal with such resources? Many Americans were shocked a few years ago to learn that there were only a handful of original McDonald's remaining in existence - a building type that at one time had been one of the nation's most numerous. Many Ohio sites related to the commercial impact of the automobile fall into this category. For example, Town and Country Shopping Center in Columbus is a major landmark in the development of the shopping mall. It was the first shopping center to include major stores as anchors - including the first J.C. Penney and the first Kresge (predecessor to K-Mart) in a shopping center. It was the first to stay open in the evening and have uniform hours of operation. It included all the classic elements of the modern shopping mall except an interior, covered walkway. Clearly this is a major monument in the development of a central theme of the second half of the twentieth century. The shopping center still exists but has been extensively remodeled over the years, including a major rehabilitation in 1974 and demolition of many of the original buildings in

1987.[3] These changes have left the development without sufficient integrity to qualify for the National Register long before it reached fifty years of age.

A more difficult question of integrity exists at the first Wendy's restaurant, which is celebrating its twenty-fifth anniversary, located just a few miles west along Broad Street. The building was originally a car dealership, then a night club, and finally Dave Thomas opened the first Wendy's there. It is still a Wendy's, although it has expanded into more of the original building. While many original elements remain, the interior has been changed over the years to incorporate advances in fast food technology, and the exterior has had several minor changes, including recent changes meant to revive the feeling of the original store.[4] Perhaps the building retains enough integrity to qualify for the National Register.

A related question raised when we evaluated the National Register eligibility of two porcelain enamel White Castle restaurants is how important are surviving examples of once common types. White Castle was one of the first porcelain enamel buildings. The model was the company's standard from 1928 to 1956. When we examined the buildings in 1984, only six remained. The two in Columbus, built in 1948 and 1951, were not early or unusual examples, but represented one-third of the existing type. We, the Ohio State Historic Preservation Office, thought that they were eligible as rare surviving examples of a once common, important building type.[5]

Our evaluation of the two White Castles also surfaced another common problem in working with the evidence of the recent past--a lack of information or at least published information about a property or property type. As we searched, with company officials, the history of the first hamburger chain, it became evident that some of the best material was in unconventional places. A set of placemats turned out to provide one of the best histories of the company's buildings. The National Register staff questioned our citation of placemats in the footnotes and bibliography, and yet no questions were raised later when an article appeared in the newsletter of The Society for Commercial Archaeology using much of the same material.[6]

A third difficulty with recent properties is the evaluation of common building types, especially as such building types become more standardized and more plentiful. We have been struggling with how to evaluate twentieth-century neighborhoods and subdivisions. While our work has focused on pre-World War II neighborhoods, the same issues are central to future evaluations of post-World War II subdivisions. Some of the pre-World War II areas are easy. Firestone Park and Goodyear Heights were two Akron neighborhoods developed by the rubber companies for their workers. They are significant in planning, company-worker relationships, and house types (Sears Houses). Similarly, the Tremont area in Cleveland was a haven for numerous Eastern European immigrants and contains fifteen ethnic churches. Greenhills, Ohio, was one of three greenbelt towns built by the federal government as a New Deal experiment in garden city planning. On the other end of the spectrum are the hundreds of post-World War II subdivisions that make up much of Ohio's suburban landscape. We are working hard to identify the important themes that must be examined to adequately evaluate these resources.

A final difficulty in evaluating the recent past is the persistence of earlier attitudes about a site or structure. Such reactions may be relatively benign or so pervasive that they dominate discussions of the property. These problems are well illustrated in the major controversy over the historic significance of "Blanket Hill," on the Kent State University campus, where the confrontation between students and the National Guard took place on May 4, 1970, resulting in the deaths of four students. Seven years after the event, the University proposed building an addition to a gymnasium on part of the field where the conflict took place. The May 4th Coalition was formed to protect the site from development as a memorial to the students who were killed and to the national impact of those events on ending the Vietnam War. The issue quickly found supporters and opponents. Supporters erected a tent city on the site and camped out for sixty-two days. A nomination was presented to the state review board who felt the event was too recent to warrant National Register listing unless they received strong advice to the contrary from the National Park Service. Injunctions were sought and granted on both sides. The University was enjoined from progressing with the construction until the question of its historic significance was decided, while the University got an injunction requiring protestors to leave the site. The question of historical significance was taken by Representa-

tive John Seiberling and Senator Howard Metzenbaum to the National Park Service with the request that a National Historic Landmark study of the site be done. Senator James Abourezk from South Dakota introduced a bill in the United States Senate to make the hill a National Historic Site, while several other members of Congress wrote opposing the proposed designation. During the next few months the controversy increased. A construction fence was partially torn down, and almost two hundred protestors who defied the court order to leave the site were arrested. Protestors appeared at the Ohio State Fair in Columbus, and hit Governor James Rhodes (who had called out the National Guard in 1970) in the face with a pie as he opened the fair. Newspapers across the country reported the controversy, and letters from both sides streamed into the Department of the Interior.[7]

The letters were far more plaintive than the usual comments on historic designation. A New York veteran telegraphed the Department of the Interior:

> To declare the hill at Kent State University a National Historical Site would be in effect spitting on the graves of the 35,000 Americans who died in Vietnam. I would consider this a personal insult to myself and every other disabled veteran in the country. If such action is taken I swear that I'll leave the country and I will regretfully have to renounce my United States citizenship.[8]

An equally pleading letter was sent by a participant in the demonstrations:

> I'm sitting on a pile of dirty laundry...in the back of my Renault stationwagon...I slept in here last night...it rained on Blanket Hill nearby. I've spent the last three weeks camping out in front of Taylor Hall....Students here are determined to stop the construction of that gym. There's a battle being fought here...we're holding the hill with bodies & tents...trying to get the nation to hear what we have to say. I'm crying for my country ...I'm crying to my fellow man...I'm crying for goodness...the god in all of us...to take a stand.[9]

Clearly more was at stake than a dispassionate evaluation of "Blanket Hill's" place in history. In hindsight, it is clear that the frustrations of the conflict over Vietnam were played out in miniature in the contest. It was a search for legitimacy by both sides. Historic designation thus became not just recognition, but vindication. The controversy was only seven years after the shootings at Kent State. There was no Vietnam Memorial, there had been little healing. For the protestors the bulldozers threatened hallowed ground, ground where citizens had given their lives protesting what they considered an unjust war, and as a result of that sacrifice they played an important, perhaps pivotal role in ending that war. For those who had served in Vietnam, it appeared that official historic recognition was about to be bestowed on those they considered as misguided at best and traitors at worst. The protestors who had questioned the veterans' patriotism were about to be given a monument for their actions while none existed for those who had lost their lives in Vietnam, or for the veterans, many of whom still felt like second-class citizens.

The quest for legitimacy did not stop there, however, Parents and friends saw a memorial as official recognition that a great injustice had been done. At least one writer felt that if the recognition were given it would leave out African American students killed at Jackson State and Orangeburg State College in South Carolina. [10] Finally some supporters saw the attempt to build the building as a way of removing the evidence, and thus the guilt, from the governor and those involved.

> WE ARE BEING SET UP FOR THE LAST ACT by the same Gov. James Rhodes who supplied the bullets and then the silence...and now the gradually encroaching bulldozers. NOTHING succeeds like ENCROACH-MODIFY-OBLITERATE when dealing with a haunting 7-year embarrassment....The temptation to erase derogatory historical fact is overwhelming.[11]

Very few individuals were able to look at the site with dispassion. An archivist at Yale approached such objectivity when he wrote,

> One can argue that Kent State is symbolic of an era of protest, and anti-war sentiment in the United States and it is. But historically, I believe, the significance of Kent State will be seen not so much as the symbol of student protest against an unpopular war, but rather, as a symbol of the conflict between the expression of First Amendment rights and the government's need for popular support in order to achieve the aims of foreign policy....

Americans, understandably, wish to forget the trauma and pain of the Vietnam War and the dissention and erosion of public institutions it caused. But there will also come a day when

people will want to remember and, more importantly, will need to learn yet again how fragile are our constitutional rights and the cost of defending them to each generation of Americans.[12]

Some National Register staff (including the author) felt confident that the site's significance would stand the test of time, that at any point in the future it would be judged to have been a very significant event. They recommended that the site be made a National Historic Landmark. The study did not follow this recommendation, but said the event was too recent to be judged objectively. Looking back, perhaps the study was right. The fifty-year limit may allow not only academic evaluation of an historic site, but also healing, understanding, and time for emotions to be sorted out before official recognition is given. However, this year marks the twenty-fifth anniversary of the events at Kent State, and we have recently received inquiries about putting it on the National Register. Perhaps enough time has now passed.

As we embark on an historical evaluation of the post-World War II era, some suggestions may guide us:

First is a plea for increased funding for surveys. We need to find ways to finance some broad studies of the period and its resources. Evaluating the National Register themes for this period would be a good start. Budget restraints currently dictate that most evaluations are not being done through comprehensive thematic surveys, but on a case by case basis through the Section 106 review process. Evaluation through this environmental review skews the properties evaluated toward a preponderance of roadside and residential sites and structures.

These basic thematic studies have not been done because of a lack of funding. In Ohio, for example, the World War II industrial effort has not been thoroughly evaluated, even though we were one of the leaders in the war effort. Large scale production of synthetic rubber (one of the major industrial contributions to the war effort) was developed in Akron - but the historic preservation office does not know where or what is left. The need for a survey of these sites was brought to mind recently by a National Register nomination of a B-29 bomber plant in Brook Park, outside Cleveland, a building that is now a convention center. Questions about the nomination centered on the integrity of the structure with professionals supporting both sides. Another recent structure, visited by the author with representatives of the Department of Energy, is the Uranium Enrichment Plant near Piketon, Ohio. It is an amazing facility, still operating with most of its 1953-1954 equipment. Each of these cases illustrates how much there is to learn about Ohio's World War II and Cold War industrial production. Comprehensive evaluations of the recent past could save time and money and help us identify those elements of the recent past that can best give us meaning, orientation, use, and beauty.

Second, we need to find a way to identify and list the most significant endangered resources, in cooperation with appropriate citizens and groups. The evaluation process is designed to identify, at least in part, what places people find important in their lives. As we expand the number of individuals providing their opinions, we are more likely to identify significant sites important to the public. With limited resources, we need to pick our battles so that we can provide assistance to citizens in protecting what they value. A few years ago, the National Historic Landmarks program did just this. Its architectural study had been chronologically looking at American architecture. A new staff member quickly left Greek Revival in the South and moved to skyscrapers in New York and Chicago, correctly sensing that not only were they among the most important American architectural contributions, but were also likely to be in imminent danger of demolition or major facelifts.

Finally, we need to educate the public about the significance of recent historic resources. In a rapidly changing, often rootless society it is important to help identify and explain sites that can provide meaning, orientation, use, or beauty to American citizens. In such an evaluation the modest suburb may show the government's interest in providing adequate housing for all Americans after World War II, and the vintage McDonald's may symbolize the impact of the automobile on American cities and villages.

We run a danger if we get too far ahead of the public in our evaluations. The fifty-year period was designed not only to allow dispassionate evaluation, healing, and reconciliation, but to allow the public to gain an appreciation of the resources. This is one of the reasons for state historic review boards - to provide advice on what is significant from both professionals and public members. Does this mean that the public

will (or should) agree with all of our evaluations? Absolutely not! If we are not evaluating things that are not currently appreciated by the general public, it is likely that we are not doing our job. On the other hand, we must recognize that we are involved in a public process - one with policy and fiscal implications - and if we get too far out of step with public perceptions we will be viewed as irrelevant or as a hinderance.

There is much to be done in the fascinating journey of discovery before us.

Notes

[1] National Historic Preservation Act (U.S.C. 470) Section 1 (a)(2).

[2] *Progressive Architecture* (October 1989).

[3] Robert Hendrickson, *The Grand Emporiums* (New York: Stein and Day, 1979), 272-273; *Columbus Dispatch* (6 July 1947): C-1; (10 November 1974): Magazine 44-46; (16 September 1987): C-1.

[4] *Columbus Citizen-Journal* (13 May 1974): 10; *Columbus Dispatch* (30 January 1983): 6.

[5] See National Register nomination, National Register files, Ohio Historical Society.

[6] W. Ray Luce, "White Castle and Preservation," *News Journal* 2, no. 4 (Society for Commercial Archaeology, September 1984).

[7] *Columbus Dispatch* (19, 26, 29 July; 1, 5, 7, 8, 11, 14, 15, 16, 24 August; 14 September 1977); *Columbus Citizen-Journal* (20, 29 July; 30 August 1977).

[8] David F. Kroft, Jr., to Department of the Interior, 29 July 1977, National Register file, Ohio Historical Society.

[9] Shara Van Cleave to Bob Herbst, 14 June 1977, National Register file, Ohio Historical Society.

[10] Thomas Sweigert to Cecil D. Andrus, 30 July 1977, National Register file, Ohio Historical Society.

[11] "RHODES BULLETS & RHODES BULLDOZERS, Disgrace upon Disgrace," leaflet by Joseph E. Kortan, 26 July 1977, National Register file, Ohio Historical Society.

[12] Lawrence Dowler to George F. Emory, 1 March 1978, National Register file, Ohio Historical Society.

Landmarks Preservation and the AIA Twenty-five Year Award

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Abstract
The American Institute of Architects (AIA) Twenty-five Year Award is the annual recognition by the architectural profession of distinguished structures that are approximately twenty-five years old. The award is noteworthy in terms of historic preservation because it focuses on buildings that are generally ineligible for the National Register due to that program's fifty-year rule. Although the rule is intended to allow a sufficient passage of time to put the buildings into historical context, some of these buildings are at risk due to unsympathetic changes that often occur around this twenty-five-year mark.

The Twenty-five Year Award is considered as a means of evaluating "underage" landmarks: whether it is a useful tool, the similarities and differences in the goals of the two programs, and comparison of the criteria for the AIA award and the National Register nomination. This consideration may be illustrated by several Chicago-area preservation controversies - the John Hancock Building, University of Illinois at Chicago, Marina City, and the US Gypsum Building.

The following buildings received Twenty-five Year Awards from the National AIA from 1969 through 1994:

1969 Rockefeller Center, New York City; Reinhard & Hofmeister; Corbett, Harrison & MacMurray

1970 None

1971 The Crow Island School, Winnetka, Illinois; Perkins, Wheeler, & Will; Eliel & Eero Saarinen

1972 Baldwin Hills Village, Los Angeles; Reginald D. Johnson; Wilson, Merrill & Alexander; Clarence S. Stein

1973 Taliesin West, Paradise Valley, Arizona; Frank Lloyd Wright

1974 Johnson and Son Administration Building, Racine, Wisconsin; Frank Lloyd Wright

1975 Philip Johnson Residence ("The Glass House"), New Canaan, Connecticut; Philip Johnson

1976 860-880 North Lake Shore Drive Apartments, Chicago; Ludwig Mies van der Rohe

1977 Christ Lutheran Church, Minneapolis; Saarinen, Saarinen & Associates; Hills, Gilbertson & Hays

1978 The Eames House, Pacific Palisades, California; Charles and Ray Eames

1979 Yale University Art Gallery, New Haven, Connecticut; Louis I. Kahn, FAIA

1980 Lever House, New York City; Skidmore, Owings & Merrill

1981 Farnsworth House, Plano, Illinois; Ludwig Mies van der Rohe

1982 Equitable Savings and Loan Building, Portland, Oregon; Pietro Belluschi, FAIA

1983 Price Tower, Bartlesville, Oklahoma; Frank Lloyd Wright

1984 Seagram Building, New York City; Ludwig Mies van der Rohe

1985 General Motors Technical Center, Warren, Michigan; Eero Saarinen and Associates with Smith, Hinchman & Grylls

1986 Solomon R. Guggenheim Museum, New York City; Frank Lloyd Wright

1987 Bavinger House, Norman, Oklahoma; Bruce Goff

1988 Dulles International Airport Terminal Building, Chantilly, Virginia; Eero Saarinen and Associates

1989 Vanna Venturi House, Chestnut Hill, Pennsylvania; Robert Venturi, FAIA

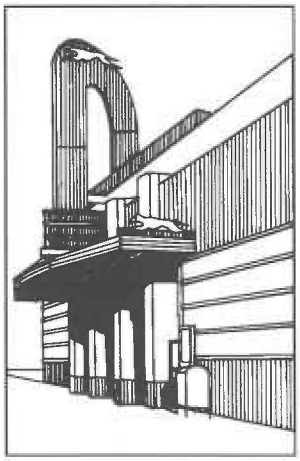
1990 The Gateway Arch, St. Louis; Eero Saarinen and Associates

1991 Sea Ranch Condominium I, The Sea Ranch, California; Moore Lyndon Turnbull Whitaker

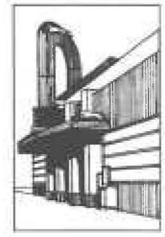
1992 The Salk Institute for Biological Studies, La Jolla, California; Louis I. Kahn, FAIA

1993 Deere & Company Administrative Center, Moline, Illinois; Eero Saarinen and Associates

1994 The Haystack Mountain School of Crafts, Deer Isle, Maine; Edward Larrabee Barnes



Gas, Food, and Lodging



Service Station Design in Texas, 1910 to the Present

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The introduction of the automobile and individual automobile ownership have defined the twentieth-century built environment of the United States. In 1895, automobile ownership stood at four.[1] Twelve years later, in 1907, 140,000 automobiles were on United States roads.[2] At this point, the gasoline industry began to recognize itself.

Gasoline had previously been an unwanted by-product of the production of kerosene. Automobile owners first purchased gasoline by the bucket, either at retail outlets - a livery or dry goods shop - or directly from bulk stations geared for wholesale business - selling to the livery and other outlets - rather than individual car service. Consequently, the market for gasoline distribution was an open field for interested entrepreneurs. Mom and Pop grocery stores began to include gasoline sales as part of their regular service. The actual method of sale was often wasteful and dangerous considering the volatile nature of the substance. Until the invention of the gasoline pump, the standard method of transfer involved a bucket and a chamois-lined funnel.[3]

A major breakthrough in the method of delivering gasoline from the main tank to the automobile originated with an invention by S.F. Bowser. His invention was a self-measuring pump that he developed initially for kerosene sales. It involved a storage tank separated from the hand pump for safety reasons. The system was easily adaptable by gasoline vendors, and by 1905, it had come to be called the "filling station." [4] Further development in gas pumps included protective housing for the pumps so that the elements and bad drivers could not damage them. In 1908, Bowser introduced his "red sentry model," which was intended for curbside use where drivers could approach from both sides, and was ideal for the tiny one-room stations that were beginning to appear.

There seems to be no consensus on when the first drive-in filling station appeared. Texaco claims the year 1905 for its first filling station. [5] At any rate, by 1929, 317,000 outlets sold gasoline to twenty-six million registered car owners, clearly indicating the enormous expansion of this new business type. [6] Simultaneously, serious competition was developing among oil companies for motorists' patronage. Competition led to the development of recognizable corporate images that could be repeated throughout the country. "A distinctly standardized design could, in any setting, be synonymous with a particular brand of gasoline." [7] Petroleum companies began to standardize the designs of their stations in order to attract and hold the loyalty of motorists, many of whom were venturing further and further from home. This standardization, which culminated in full-scale corporate imagery, developed first as color schemes and logos, then expanded to include building forms (Figure 1).

Moving from the 1910s through the 1920s, 1930s, and 1940s, the functions of the service station became more clearly defined and the form of the building changed in direct response to these needs. Display areas for products increased, and the inside sales area expanded to include a waiting area for customers. Several garage bays with lifts and pits - sometimes known as the "lubritorium" - offered full automobile servicing. Restrooms became standard features.

Prefabricated building systems were introduced, allowing a particular station to be taken down with relative ease if its location turned out to be unprofitable. New materials, such as porcelain enamel panels, provided low maintenance and cleanliness that were important to a station's public image (Figure 2).

The Texas Company/Texaco
The Texas Company, established in Beaumont, Texas, in 1902, attached itself early to the red star logo. As early as 1913, the red star became a recognizable image to attract customers to its Texaco line of products and service. Texaco enlisted the services of industrial designer Walter Dorwin Teague in the 1930s, who provided the company with five options for standardized designs. With modifications for adaptation to different lot configurations and options, such as canopies, standardized stations were repeated across the state and throughout the nation (Figure 3).

Magnolia Petroleum Company/Mobil
The Magnolia Petroleum Company developed a very recognizable residential building form that was repeated across rural Texas. Typically, it had a hipped roof with exposed and sculpted rafter tails (Figure 4). The pump island was accessible from both sides, with sturdy brick columns flanking the pump. Although most often constructed of brick, variations on the design included frame buildings. An example in Itasca, Texas, did not use brick but rather a regional field stone material with cut stone detailing reminiscent of the brick detailed version.

Figure 1. Sinclair Oil Company developed a distinctive Mission style station with stuccoed walls and tile roof parapets as a standard station design (circa 1930s), shown here on a period road map. This recognizable form still exists throughout Texas, now sometimes occupied by other businesses such as Pizza Hut and automobile-related shops. (Photo courtesy of Richard Ryan)

Figure 2. Porcelain enamel panels were one of the new materials adopted for gasoline station construction by mid-century, shown here on a Gulf Oil station in Little Falls, New Jersey (circa 1940s). The station also bears the company's trademark horizontal blue stripes. (Photo courtesy of Richard Ryan)

Figure 3. Walter Dorwin Teague updated Texaco's standard stations in the 1930s, with horizontal banding, white wall treatment, and a parapet punctuated with bright red stars. A canopy topped by two parallel fins was a noted feature of one of Teague's designs. Austin's Sledd Nursery at 12th Street and West Lynn Street is a finely preserved example of a Teague station from this period. (Photo by author)

Figure 4. Magnolia Oil Company's station had a residential appearance (circa 1920). Constructed of dark brick, it had contrasting light colored stone used as lintel and sill pieces at the doors and windows. This example is in Dallas. (Photo by author)

For their more elegant stations, Magnolia used similar materials, but the building was of a much larger scale and much more elaborately detailed. The company's stations from the 1920s in Amarillo, San Antonio, Fort Worth, and Houston, all demonstrate a preference for corner lots with drive-through access from at least two sides. Although different architects are credited with the buildings' design, standard design elements are consistent among them.

By the 1940s, Magnolia Petroleum Company had become Mobil, and the flying red horse appeared as its signature logo. Mobil's stations of this period demonstrate a modern design while maintaining many of the same features as its past stations, such as the common use of materials that are easy to clean and offer longevity and durability.

Humble Oil Company

Consistent with other oil companies, early Humble stations demonstrated an attitude of easy access of curbside service. Humble's first station in Houston was completed in March, 1919, and cost $50,000. The company intended to get its name out on the market, but for the following decade only owned three or four other stations. [8] Humble stayed out of the service station competition until the 1930s.[9] By 1938, the company had developed its logo signage that included an oval edged in blue with white letters on an orange background. Variations on this color scheme continue throughout Humble's history. By the late 1940s, the company had adopted all of standard gasoline station features of the period: a canopy for covered service, display windows for product advertising,

garage bays for lubrication and car washing, and restrooms.

Shell Oil Company
Shell Oil Company did not come to Texas until 1929, but the company's early work in other parts of the country started with the idea that each station should be designed to fit its location. In practice though, providing individualized stations proved far too expensive. Around 1935, two general styles of building began to emerge, one for new construction, the other for remodelling older stations built during the 1920s.[10]

Like other oil companies, Shell adopted the pristine, industrial look and the contemporary materials - porcelain enamel panels - of the 1930s. By the 1950s, its stations also included substantial night lighting, to make service easier at night. Austin's Flamingo Garage on Guadalupe and 34th Street is an example of a Shell station that has been successfully reused.

Conclusion
Gasoline stations were one of the first industries to develop the use of corporate imagery in buildings as a marketing technique, which is now taken for granted. Other businesses followed their lead, adopting the practice of repeating building designs across the country. The results included recognizable built forms on a nationwide scale and efficiencies of construction costs (Figure 5).

The design of service stations has come full circle - now gasoline is most commonly sold at convenience stores that also sell a wide variety of products beyond those for the automobile. The grocery store / gasoline station is once again the most common configuration. The full service station only selling products for and servicing the automobile is on the wane.

Notes

[1] Federal Highway Administration, *Highway Statistics: Summary to 1985* (Washington, DC: Federal Highway Administration).

[2] "Planning Techniques for New and Remodelled Buildings: Service Station 1," *Architectural Forum* 66 (February 1937): 86-95.

[3] Daniel I. Vieyra, *"Fill'er Up": An Architectural History of America's Gas Stations* (New York, New York: Collier Macmillan Publishers, 1979), 3-7.

[4] Ibid.

[5] James Marquis, *The Texaco Story: The First 50 Years 1902-1952* (New York, New York, 1953).

[6] "Planning Techniques for New and Remodelled Buildings: Service Station 1."

[7] Vieyra, 13.

[8] Henrietta Larson and Kenneth Wiggins Porter, *History of Humble Oil and Refining Co.: A Study in Industrial Growth* (New York, New York: Harper Brothers, 1959), 62.

[9] Texaco, Gulf, and Magnolia each controlled about twenty percent of the gasoline business in Texas, and Humble only five to six percent, circa 1919. Magnolia owned about 800 Texas gasoline stations, while the Texaco and Gulf companies

Figure 5. Continental Oil Company's Streamline Moderne Conoco Station (circa 1940s), Dallas, Texas, includes column capitals abstracted to concentric disks on sleek, steel columns. The aerodynamic curves of its projecting glass front contribute to its futuristic look. (Photo by author)

controlled over 1,000 each. See Larson and Porter, 233.

[10] Kendall Beaton, *Enterprise in Oil; A History of Shell in the United States* (New York, New York: Appleton-Century-Crofts, Inc., 1957), 419.

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In Search of the Vernacular Twentieth-century Drive-in Restaurant

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During the 1980s, several scholars released studies that established the drive-in restaurant as a significant genre of twentieth-century commercial architecture. These studies provided rough data on the geographic distribution of drive-ins as well as snapshots of selected architects and periods of architectural development.[1] Those of us involved in historic preservation often refer to these early studies as we recognize and record commercial architecture in cultural resource surveys, designation procedures, and adaptive reuse or rehabilitation projects. While we are vastly more knowledgeable today because of the early studies, most of us encounter drive-in restaurants that are best described as vernacular, with various architectural elements and random updates following industry developments. Our common drive-in restaurants reflect a wide range of creative and individual expression amplified by layerings of materials and architectural or industrial elements. These drive-ins are often difficult to identify and document using these existing studies.

This paper addresses the physical development and architectural progression of the Pig Stand Company of Texas. While the Pig Stands are only one type of many drive-in restaurants, most scholars of commercial architecture recognize Pig Stands as responsible for a significant influence on the genre across the United States. Pig Stands are equally important because their extensive corporate archive allows study from inception to development of a corporate image well past World War II. Based on this company, preservationists can better identify and evaluate vernacular drive-in restaurants with temporal boundaries and a uniform methodology. Four periods best define temporal boundaries applicable to most drive-ins: 1921 to 1926, 1927 to 1935, 1935 to 1941, 1945 to 1963. Six elements allow for in-depth examination into each period and provide a methodology for analysis: spatial or building form (roof form, building footprint), design or stylistic influences, materials, internal and external building usage, site characteristics and features (signage, canopies), and cultural and trade or industry context.[2]

1921-1926 Drive-in Restaurants

The drive-in derived more from the simple roadside stand than from the restaurants of the early twentieth century.[3] From circa 1910 to 1930, wooden roadside stands appeared along the expanding road network following the extensive development of highways and increasing number of motor tourists. By 1925, an estimated one hundred thousand roadside stands lined the nation's roads, selling food and drinks, souvenirs, automobile equipment, and articles of apparel.[4] An informal business relationship existed between these roadside proprietors and automobile customers where the proprietor interacted directly with the customer in order to sell goods. This relationship spawned an equally informal architecture.

Roadside proprietors built practical and inexpensive structures typically consisting of a rectangular wood-frame building set on wooden posts, sometimes without a floor, rising to one story and covered with a shed roof, usually clad in metal. The stand placed all its marketing design and language on the principal facade, which faced the road. The common stand included an enlarged kickplate set on the foundation, a horizontal band of open space

serving as a counter or display space, with a wooden window covering that dropped down when closed or in inclement weather (also serving as an awning in hot weather), and an upper facade that terminated in an unadorned cornice or roofline. Proprietors used all surface areas for signage, with stands varying in the amount of area devoted to imagery and the quality of the signage. Internal use of the stand also varied depending on the goods or services offered. The focus on daytime and fair-weather sales eliminated the need for most lighting, but occasionally stands included limited interior and exterior lights. Stands were typically set back from the road to allow parking. The final location, however, depended on the amount of signage and the projected speed of autoists.[5] In the following description, roadside stands of the mid-1920s are recognized for their informality and image:

> In many cases the stands are no more than a shelter of old boards or a disreputable shack. Such structures when covered with raucous and hideously colored signs and cards are horrible to look at, and this condition cannot fail to have an unfavorable effect on the advertising matter which they display.[6]

Roadside stands as discussed above are often associated with rural areas, but they were equally common in urban areas. Early 1920s building permits in Dallas, Texas, show a number of listings for "frame restaurant and drink,""barbecue,""box barbecue," and "box refreshment" stands within the city limits. These varied in construction costs from $100 to $350. In some listings, the owner of the stand also served as contractor, reinforcing the vernacular building form and essential business relationship mentioned earlier.[7]

In September 1921, Jesse G. Kirby combined the idea of the inexpensive roadside stand with barbecue pork sandwiches, a popular Southern food item. Kirby collaborated with Dr. Reuben M. Jackson, prominent surgeon, on their first drive-in stand with curb service in Dallas. Kirby built Pig Stand No. 1 at the intersection of Chalk Hill Road and the Dallas-Fort Worth Turnpike on the edge of Dallas's burgeoning southern suburb of Oak Cliff. Kirby's first site selection became the basis for almost all new Pig Stand locations over the next two decades. Because the Dallas-Fort Worth Turnpike was the most heavily traveled road in Texas by 1920, it provided an ideal setting to attract automobile travelers. The Turnpike also served as the North Texas link of the transcontinental Bankhead Highway, from Washington, DC, to San Diego, California.[8] There is no extant photograph of Pig Stand No. 1, but several exist of Pig Stand No. 2, built shortly after No. 1 and only a few miles from it on Zangs Boulevard at the intersection of the Houston Street viaduct (Figure 1). This location was also on the Bankhead Highway, but much closer to the commercial and residential center of Dallas, presumably recognizing that the Pig Stand appealed to urban residents as well as travelers.

Photographs of Pig Stand No. 2 illustrate what we presume to be the vernacular elements of the

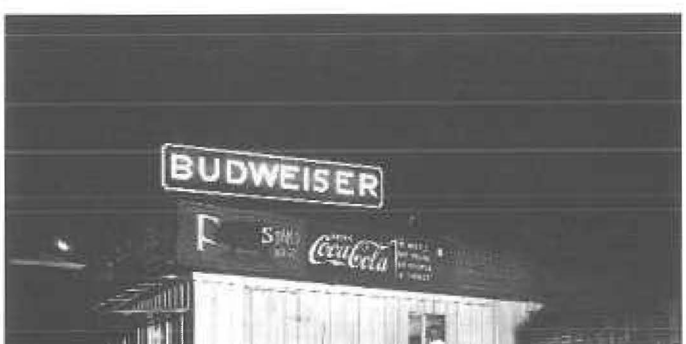

Figure 1. Pig Stand No. 2.(From the collection of the Texas/Dallas History and Archives Division, Dallas Public Library)

1921 to 1926 era of Pig Stand drive-ins and is little more than a slightly improved roadside stand. In this building, the proprietor still interacted with the customer, but found his place slightly more to the rear of the stand where he could see the customers but only communicate and exchange money when necessary. Male carhops instead became the extension of the proprietor and thus redefined the architectural form by placing the emphasis on quick service. This change in the fundamental business relationship allowed the interior to be reconfigured for food preparation and delivery. Thus, the new Pig Stand continued the rectangular form, but emphasized the horizontal service window and abundantly displayed signage. Kirby may have anticipated the increasing speed of the automobile by enlarging signage and selecting a bold typeface. During this early design and development stage, Pig Stands maintained an outdoor barbecue pit or grill and primarily selected corner sites facing at least one major right-of-way. These early drive-ins tended toward chaotic use of exterior space, providing no organized parking, and thriving in part on the random social network created (Figure 2).

1927-1935 Rectangular and Octagonal Drive-In
By 1927, the Pig Stand Company split, with the principal business and franchises remaining in Texas and extending to the East Coast, and a California subsidiary arising in Los Angeles. Two architectural forms emerged that set the pace for drive-in designs through the 1960s: the rectangular and octagonal forms.

The Texas design standardized a rectangular form appearing to be very similar to the former wooden stand (Figure 3). In some locations, the

Figure 2. Pig Stand No. 71. (Photo courtesy of Texas Pig Stands Company, San Antonio, Texas)

Figure 3. An example of a Texas-design Pig Stand. (From the collection of the author)

wooden structure may have been attached to the rear of a new building or covered with a new roof and stucco siding, but in most cases the form and design were used on a new franchise or company-owned location. The rectangular form retained the large horizontal band of windows, but each window now represented one of the three or four bays on the facade. Instead of raised wooden coverings over the windows, each one appears to have included a lower wooden sash that lifted up behind the upper sash advertising. A cloth awning sometimes hung above the window opening on western-facing facades. Some examples of this form included a single wooden door with large transom as the fourth bay on one facade. In almost every example of this form, the building used only two sides of the rectangle for service, leaving a third with a lean-to storage area and the fourth for rear service needs. A substantial roof in the shape of a "pagoda" covered in terra cotta tiles dominated the form.

Signage again covered all surface spaces above and below the window as well as corner columns. The most significant addition became the lighting both on stylized pylons rising at each corner of the roof, especially those facing the street, and incandescent lights under the awning. Additional lighted signs sometimes sat on the upper roofline and along the street. After Pig Stand used its first neon sign in 1923, the silhouetted pig outlined in neon became a standard feature with the rectangular drive-in form.

The drive-in site also began to change, with a slightly more organized use of parking spaces placed in a loose semi-circle facing the building and, in at least one example, a Pig Stand site included a gable-roofed awning. In most cases, corner lots continued to be preferred but several notable alternatives emerged such as the rectangular form attached to a Piggly-Wiggly grocery on McKinney Avenue in Dallas.[9] Internal use of the building expanded to incorporate cooking facilities, food preparation areas, and counter service. In most locations, the proprietor interacted less with the customer and increased the use of carhops. This rectangular form clearly intended to attract the autoist traveling at a higher speed by use of the raised roof, lighting, and extensive signage. The form also reflected a Spanish Colonial Revival regional stylistic influence.

The California design, initiated by the subsidiary based in Los Angeles, began with an octagonal-shaped stand. Other than the basic shape, the California example retained many elements of the first roadside stand (Figure 4). The stand rested almost directly on the ground and exhibited little architectural ornament or style. Banded horizontal windows, first with raised wooden covers, wrapped around the octagonal form. The upper and lower facades carried the now common silhouetted pig advertising in a simple typeface and statement. A semi-permanent cloth awning hung above the windows. Indirect lighting extended out from the roofline so as to illuminate the signage. In the earliest stand, strings of incandescent light bulbs stretched across the parking lot, perhaps to provide lighting for nighttime diners. Shortly after the introduction of the Pig Stand to Los Angeles, the company improved the octagonal

Figure 4. A California- design Pig Stand. (Photo courtesy of Texas Pig Stands Company, San Antonio, Texas)

form by adding multi-colored glazed tiles on the lower facade and enhancing the advertising with sophisticated typefaces and layout (Figure 5). In addition, a large, brilliantly-lighted sign above the roof advertised the stand's principal food - sandwiches - at night. In a still later site improvement in the early 1930s, a permanent awning extended several feet from the original building with a pent roof of terra cotta tile. This addition appears to have allowed more counter service, particularly in inclement weather. At this point the "sandwiches" sign was raised even higher on a substantial metal structure.

The California octagonal design differed from the rectangular in that it allowed better use of the site by accessing almost all of the facade, although it also appeared on a corner location. It also streamlined the interior use of space by placing the cooking facilities in the center and the preparation and quick-item delivery along the perimeter. The improved versions of the octagonal design created a foundation for the building and gave more attention to the details of the site. The early 1930s version made counter service more formal and recognized the increasing speed of automobiles and perhaps the need to attract customers from the growing competition.

The 1927 to 1935 rectangular and octagonal forms began to make the "stand" and pig barbecue pork sandwich respectable. Pig Stands spread across the country from California to New York to Florida. In almost all examples, the design of the stand became more streamlined, sophisticated, and appealing to the middle- and upper-middle class customer. One of the most important designs in the octagonal form appeared in Beverly Hills, California, circa 1930, where three octagonal tiers served as the roof pylon and all lettering and ornamentation reflected the influence of the 1925 Exposition des Arts Decoratifs in Paris on the period's architecture that became known as Art Deco.

The business relationship between the proprietor and customer defined in the early Pig Stand became more distant as many proprietors were simply investors and often absentee owners. This distance gave the carhop an even larger role in the business and as an extension of the architecture. In some examples of this period, special carhop windows and doors appeared, confirming that the business change became a physical one. Grills or barbecue pits, formerly an exterior element, began to be incorporated on the interior during this period. This required a spatial change on the interior that made the principal building larger or called for a rear or side extension.

The most important development in the 1927-1935 drive-in is the complete transition to on-site head-in automobile parking. Site plans from this period placed the principal building back from the highway, leaving ample space for auto parking. In almost all examples, automobiles faced the building, usually in rows arranged in circular bands. This development completed and established the name for this genre of commercial architecture: "drive-in restaurant."

1935-1941 Drive-In Design

In 1935, drive-in entrepreneurs shifted from the heretofore emphasis on the simple functional

Figure 5. The "enhanced" octagonal Pig Stand. (Photo courtesy of Texas Pig Stands Company, San Antonio, Texas)

aspects of the drive-in design to the use of architecture to draw customers in an increasingly competitive environment. A large number of traditional restauranteurs broke ties to downtown cafes and eateries and endorsed the drive-in restaurant.[10] Many new drive-ins either modified the rectangular form or followed the popular new circular design pioneered at Simon's in Los Angeles. Wayne McAllister of Los Angeles designed the circular Simon's drive-in (1935), but followed quickly with Herbert's, Robert's, Van de Kamp's, and Carpenter's drive-ins also in circular forms.[11] Although McAllister is credited with the early circular design, a modified circular form appeared in the July 1934 issue of *Architectural Record* in a special section entitled "Roadside Diners." These two designs came from tutored pupils of Kem Weber at the Art Center School in Los Angeles and were illustrated by models quite similar to McAllister's Simon's. To make the connection to the existing octagonal drive-in designs, the article included two photographs of Carpenter's drive-in across the street from the Pig Stand.[12] Distinctive elements of the circular plan became the large pylon centered on the roof, extensive use of neon and lighting as part of the architecture, an extended octagonal canopy, and covered counter space. The design streamlined the entire operation including internal circulation, food preparation and serving areas, counter space, signage, and even parking spaces on the lot.[13]

The impact of the circular form was phenomenal. McAllister adapted the circular form in other drive-ins of the late 1930s in California, while circular versions spread across the country. Sam Lobello, Jr., and his father, Sam, Sr., traveled by Zephyr train to Los Angeles in 1935 to see Simon's and purchase the plans from the architect. Upon their return to Dallas, they hired local architect Charles Dilbeck and built a modified circular form drive-in far out of town on Preston Road, a former dairy farm. Lobello's father, a contractor for some of the early Pig Stand drive-ins, built the new drive-in. Within a few years, the Lobellos built another, unmodified, circular drive-in near the Dallas airport, Love Field.[14] Several years later the Pig Stand Company used the circular design for updating a location in Beaumont, Texas (Figure 6). Other new drive-in operators did the same and the form appeared in variations in many states by 1941.

From 1935 to 1941 the circular form proved most influential and distinctive for new drive-ins, but the rectangular form continued to dominate design. Hundreds of drive-ins appeared during these pre-World War II years and by far the majority continued to use the rectangular form. In 1939 the Pig Stand Company built a new restaurant in San Antonio, using the rectangular base but modified the customary horizontal open windows with bands of plate glass, circular glass windows, and glass blocks (Figure 7). The principal entry became a single glass door with glass block surround and neon accents. A cornice-level band of neon extended around the building highlighting its rectangular substance. The major element of the new Pig Stand, however, was a vertical pylon with extensive neon and lighted name that advertised the business

Figure 6. The circular-design updated Pig Stand. (Photo courtesy of Texas Pig Stands Company, San Antonio, Texas)

for several blocks and was similar to that used in many circular designs. All of the elements on the rectangular form reflected the influences of Streamline Moderne design.

During the 1935-1941 period, of drive-in restaurants experienced other significant changes. While design continued to split between circular and rectangular forms, new materials allowed large expanses of glass to be used to open dining facilities to the outside. Traditional downtown restaurants and cafes were encouraged to add plate glass to make walls "invisible," obtain "stopping" power, and put the entire restaurant on "display."[15] Neon, first introduced in limited scope in the 1920s, became integral to the design of the drive-in. For the remainder of the life of drive-ins, neon became a part of almost every business and building. Drive-ins appeared in communities across the country with urban areas still claiming the majority. Young women now almost exclusively replaced young men as carhops. Carhop attire was transformed from the clean apron-front men of the 1920s to young women dressed in flashy, military-influenced uniforms, feathered hats, and ankle-high boots. Sivil's of Houston, Texas, received coverage of its carhops in the February 1940 *Life* magazine article on "roadside service." When carhops did not dress in military uniforms, they often adopted thematic dress like Western attire. The female carhop became the fashion model of the pre-World War II years.

In other changes, drive-in restaurants, originally the purview of the novice restauranteur, became acceptable to the traditional food service industry. Restauranteurs moved to outlying areas along busy highways and found it worthwhile to cater to autoists. In some cases, the move during the 1930s saved downtown businesses that could not survive during the Depression. Even national and state industry organizations began to boast of the virtues of the drive-in restaurant and extol its worthiness in industry publications. In Texas, the earliest leaders of the industry organizations came from the Pig Stand managers who eagerly placed their once "scorned" business in the forefront. As a result, drive-ins attracted the attention of industry suppliers, and food service at drive-ins became more streamlined with innovations such as clip-on trays and bagged food items.

By 1941, drive-ins made substantial returns on small investments and attracted all classes. But within a few short months the business experienced great turmoil. Because drive-ins depended on automobiles for business and many lay a distance from the community core, gas rationing in late 1941 led to a quick demise. Lobello's in Dallas, Texas, earned an average of two thousand dollars each day with fifteen curb girls and fifty cent meals. On the first day after gas rationing, the business earned seventy-one dollars and closed within five days.[16]

1945-1963 Drive-in Design

During the war years, many drive-ins closed or reduced hours, but by 1945 the business entered another period of expansion. From 1945 to approximately 1963, drive-in restaurants dotted

Figure 7. The Streamline Moderne-influenced Pig Stand in San Antonio, Texas. (Photo courtesy of Texas Pig Stands Company, San Antonio, Texas)

many small towns as well as urban centers. Many new businesses became more casual than the immediate pre-World War II ones and some attracted an undesirable clientele. This factor largely contributed to the closure of many drive-ins in the early 1960s. Despite the eventual demise, drive-ins flourished for roughly twenty years after World War II.

Most designs continued to be either rectangular or some combined circular and rectangular form. Almost all new businesses incorporated inside dining, sometimes tables and booths and counter services. Corner lots continued to be preferred locations, but ingress and egress as well as parking spaces became much more defined and controlled. More emphasis was now placed on site characteristics such as islands of grass, flowers, and trees. Large free-standing awnings in a range of designs and shapes became almost a requirement for a new drive-in. These provided a year-round service area and seemed to unite the various landscaping and parking features to the principal building. Secondary buildings for storage, restrooms, and other services became standard especially for large businesses. Signage, already large and distinctive, in some cases became larger, with the rooftop pylon sometimes moving to a detached pole along the street or highway. Neon continued to provide nighttime appeal for almost all drive-ins.

Conclusion

As typified by Pig Stands, drive-in restaurants evolved over a number of years through the intermingling of social, cultural, architectural, and economic forces. These forces combined to form the temporal boundaries and distinctive changes in the various elements discussed above in each period. The few remaining or former Pig Stands typically include elements from several of the identified periods that can only be understood by conducting interviews and oral histories, investigating photograph and postcard archives, and sorting through community archival sources such as city directories. When examining the roadside today, we must keep in mind that little may remain from former drive-in restaurants. Free-standing awnings, neon signage, distinctive roof forms, and corner sites may be only the clues that lead us to early drive-ins.

We should continue to document this genre of commercial architecture and to compare and contrast findings over the next decade. With thoughtful application of temporal boundaries and consistent use of methodology, we will be better equipped to understand vernacular drive-in restaurants that lined many streets and highways in our communities, but are often overlooked in our preservation work.

Notes

[1] John Baeder, *Gas, Food, and Lodging* (New York, New York: Abbeville Press, 1982); Chester H. Liebs, *Main Street to Miracle Mile* (Boston, Massachusetts: Little Brown and Company, 1985); Alan Hess, *Googie* (San Francisco, California: Chronicle Books, 1985); Philip Langdon, *Orange Roofs, Golden Arches* (New York, New York: Alfred A. Knopf, 1986).

[2] These elements largely follow the classifications defined by Thomas C. Hubka in *The Forum* (Society of Architectural Historians, December 1985).

[3] John Jakle discussed this influence in "Roadside Restaurants and Place-Product-Packaging," *Journal of Cultural Geography* (Fall-Winter 1982).

[4] "The New Outlet-Roadside Refreshment Stands," *Printer's Ink* (22 April 1916): 128.

[5] The term "autoist" appears frequently in period publications and may refer to the automobile oriented tourist, thus "auto-ist."

[6] *Printer's Ink*, 128.

[7] City of Dallas Building Permits, 1919-1924.

[8] *Locke's Good Road Maps*, published in conjunction with the Dallas Automobile Club, 1918.

[9] Interview with Sam Lobello, Jr., 22 November 1991.

[10] Nils Otto, "Drive-In Restaurants," *The Chuck Wagon*.

[11] See *Googie* by Alan Hess for an overview of the McAllister design.

[12] "Roadside Diners," *The Architectural Record* (July 1934): 56-57.

[13] Alan Hess, *Googie*, 19-26.

[14] Interview with Sam Lobello, Jr.

[15] E.A. Lundberg, "Good Store Fronts Are Good Assets," *The Chuck Wagon* (February 1947): 20, 26.

[16] Interview with Sam Lobello, Jr., November 22, 1991.

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International, 1994.

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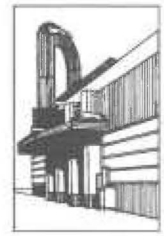
Richard Hailey, Jr., Texas Pig Stands Company, San Antonio, Texas, 1991, 1994.

Sam Lobello, Jr., Lobello's Drive-In, Dallas, Texas, November 22, 1991



Accommodating the Traveler: The Development of Tourist Courts on US Route 20 in New York State

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Introduction

The development of tourist courts is an American phenomenon directly associated with the origins and growth of automobile travel. The tourist cabin, a free-standing structure used for overnight accommodation at a tourist court, is a distinctive building type that arose from public and private auto camping and served as an alternative to the hotel. As the forerunner of the motel, the tourist court was the dominant form of accommodation along United States highways during the first half of the twentieth century.

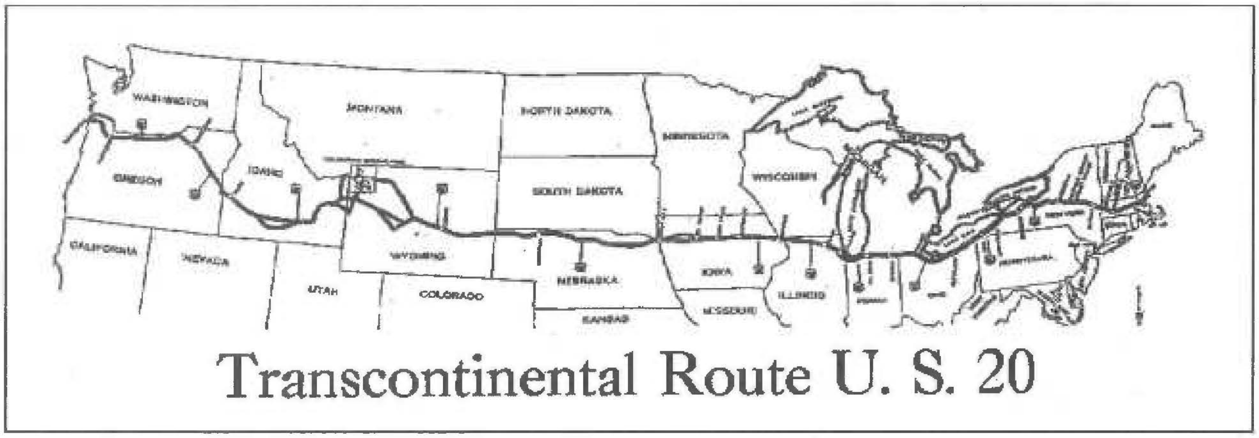
Although estimates vary, there were approximately 30,000 courts with 250,000 cabins serving 30,000,000 guests in 1934.[1] Courts were promoted by highway booster groups and industry associations. Their operators were assisted by publications such as the *Tourist Court Journal*, which emphasized greater professionalism in the court trade.[2] The court industry declined during World War II but resumed after the war, helped by returning servicemen looking for self-employment opportunities. However, "during the postwar years, motor courts changed in appearance as well as in name. Individual cabins... slipped from fashion as single buildings comprising a string of rooms, less costly to construct, gained favor."[3] Thus, by the mid-1950s, courts were eclipsed by motels. Today, highways once lined with cabins and their associated buildings present scattered remains of deteriorating complexes. With few exceptions, tourist courts have been in decline for the past forty years and are rapidly disappearing.

The years 1920 to 1955 span the development of tourist courts in the United States. This same time coincides with the period of importance of US Route 20 as a major east-west highway in New York State. It was already a significant road at the beginning of automobile travel. The highway passed through few cities and thus was not subject to intense development pressures. The New York State Thruway was constructed parallel to US Route 20 in 1954, further ensuring that the integrity and character of the older road would remain generally intact. For these reasons, examples of tourist court development from all periods of the building type's history survive, with especially strong examples from the 1930s. Route 20 presents an unusually rich opportunity for the first-hand examination of courts and cabins.

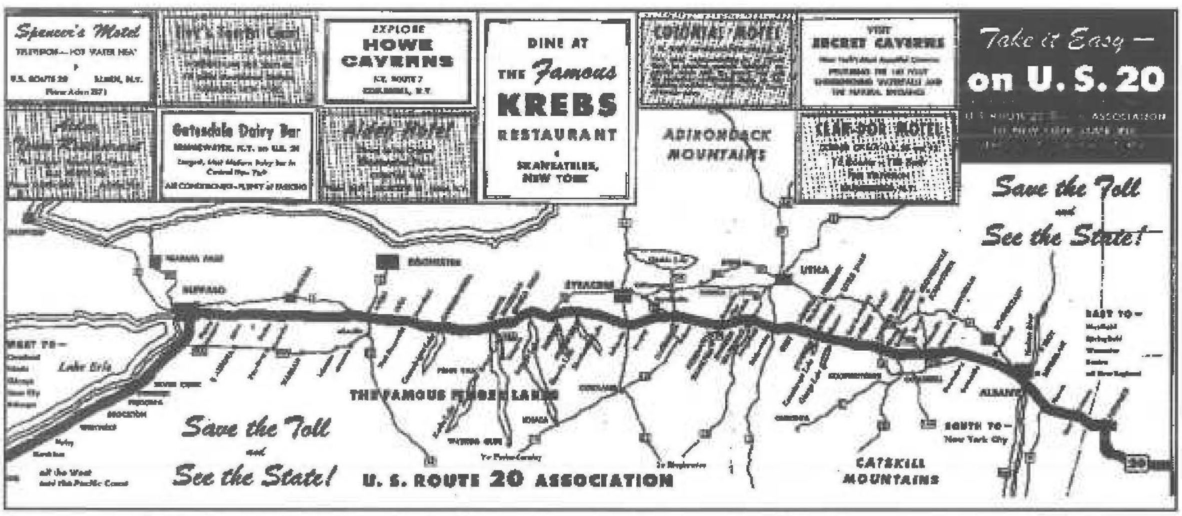
Methodology

Between 1985 and 1992, the author embarked on a project to document the remaining tourist courts on US Route 20 in New York State. Every site with at least one cabin was noted. In most cases, more than one cabin was extant, often standing with related buildings, making positive field identification of courts possible. Individual cabins that had been physically joined to create a single building were included in the count. However, modern motels, originally constructed with multiple units and shared systems, are outside the scope of the study and were not recorded except when found in conjunction with cabins. The study identified ninety-six courts in 1985. Seven years later, eighty-five courts remained. For the purposes of description, a total of ninety-six courts form the database for this study.

Once identified, the ninety-six courts were mapped and their physical characteristics recorded. Next, court histories were established



The course of US Route 20 across the country. (Source: The Cherry Valley Turnpike, Waterville, New York: The Cherry Valley Turnpike Association, 1932)



The course of US Route 20 in New York State. This c.1955 promotional brochure distinguished the highway from the newly-opened toll road, the NYS Thruway. (Source: Collection, T. Werbizky)

through interviews with past and present owners and operators who shared family memories, photographs and postcards. Finally, business and telephone directories, tourism promotion materials, and the annual guides of the American Automobile Association (AAA) were consulted.[4] These sources were cross-referenced to develop an overview of the extent and nature of courts, to create a context for evaluating remaining examples, and to record detailed information about specific courts which exemplify particular aspects of cabin and court design.

The following pages describe the development of US Route 20 in New York State and its tourist courts. The paper concludes with observations on the future of the highway's remaining courts.

US Route 20 in New York State

The present course of US Route 20 in New York State is an approximately 400-mile segment of a transcontinental route. According to one author, it is "America's longest highway, one of two remaining bicoastal old roads."[5] On the East Coast, US Route 20 begins at the western edge of Boston; it terminates on the West Coast near

Newport, Oregon. It extends some 3,000 miles and passes through eleven states. US Route 20 links Massachusetts to Pennsylvania by passing through fourteen central New York counties. It avoids the state's major population centers, except for Albany and Buffalo. Instead, the road passes through smaller communities, literally serving as their "main street." The majority of the route is a two-lane, black-top highway; approximately ninety miles are four-lane divided highway.

Highway History
Much of the present course of US Route 20 in New York State originated from Native American trails that were incorporated into turnpikes beginning in the 1790s. Of these, the Cherry Valley Turnpike, linking the Village of Cherry Valley (55 miles west of Albany) to the Syracuse region, is probably the best known.

Although the road was important in the early nineteenth century as the major east-west course across central New York, its fortunes declined as canal and rail systems were built within the same transportation corridor. Beginning in 1890, after decades of neglect, state and federal highway programs provided much-needed road building and management assistance. Portions of the road were widened and paved in brick and Portland cement. By the late 1920s, the road received its official designation as US Route 20 under a Federal plan to create a comprehensive and uniform scheme for road identification.

Before and after official designation, sections of Route 20 were known by colorful names typical of the period. The entire road was referred to as "The Yellowstone Highway" because of its connection to the National Park. In the eastern part of New York State, the highway continued to be called the Cherry Valley Turnpike. The section through the Finger Lakes region was called "Greater Broadway." Until the Federal highway shields bearing "US 20" were in place, pole markers of red and white horizontal bands and the numeral "7" identified the route.

The federal designation established Route 20 as a great coast-to-coast highway. The Cherry Valley Turnpike Association, founded in 1926 and the highway's most vigorous booster organization, proudly declared, "A broad ribbon of concrete and macadam which traverses the northern states has become one of the best known highways in Northern America."[6] The Association promoted US Route 20 as the shortest route across the state and one that offered beautiful scenery, proximity to historic sites, ease of travel, and attractive accommodations.

As traffic increased, several road projects of the 1930s straightened US Route 20 over hilly terrain that had been previously avoided. At the same time, plans for a four-lane through-route across the state were first envisioned. In 1944, the state issued a report calling for the construction of a superhighway, based in part on the success of the Pennsylvania Turnpike. It was to be a "...high speed roadway, serving both pleasure and commercial vehicles, [which] would parallel NYS Route 20."[7] In 1948, the first four-mile segment of the superhighway carried traffic on a toll-free basis. Although officially opened in 1954, it was not until 1960 that the "full 559-mile Thruway System went into effect, the longest toll road in the world."[8]

Impact of the Thruway
Much of the same booster spirit expressed for US Route 20 during the 1920s and 1930s was extended to the Thruway. However, individuals and business owners who depended on through traffic along the highway were not enthusiastic. Tourist court, restaurant, and gas station owners declared that the Thruway was "killing" them and that Route 20 was becoming a "ghost road."[9] A report from the New York State Department of Public Works stated that business was off forty-four percent between 1954 and 1955.[10] All sources agreed that the Thruway's successful first year was at the expense of Route 20 concerns.

Fighting Back
To fight the Thruway's negative impact, the US Route 20 Freeway Association of New York State was formed in early 1955. It consisted of three organizations: The Cherry Valley Turnpike Association, the Route 5-20 Association, and the US Route 20 Businessmen's Association. They were joined by chambers of commerce, tourism groups, and business owners concerned with the fortunes of Route 20.

In June 1955, the Association initiated an ambitious campaign, stressing to the traveler "the multifold advantages of Route 20 as a scenic drive or as a good high-speed highway."[11] The campaign produced 100,000 brochures promoting historic sites and tourist accommodations, and launched a petition drive requesting that the New York State Legislature officially designate the highway the "New York State Route 20 Freeway," to distinguish it from the Thruway

and its tolls. Such lobbying and promotional efforts continued for a few years, but with limited success. In 1962, the Association disbanded.

US Route 20 Today
Several projects planned in the 1950s and implemented by 1980 continued to straighten the highway's route. The Village of Cherry Valley, once a turnpike terminus, was bypassed. In central New York, Route 20 was removed from downtown Canandaigua. These and other projects established the present course of US Route 20.

Traffic volume and business activity on Route 20 have never rebounded to pre-Thruway rates. Today, the road serves mainly to connect small communities. At community edges there remains a remarkable collection of cabin courts, reflecting the former importance of US Route 20 as a tourism highway.

General Court Characteristics
Date of Construction
Prior to the late 1920s, cabin courts were rare on US Route 20 in New York State. Instead, free and paid automobile camps were the norm. Some offered only parking spaces, while others provided showers, a general store and kitchen.[12] Albany, Auburn, Canandaigua, Fredonia, Morrisville, New Lebanon Center, and Syracuse offered camp sites, according to the 1924-1925 AAA guide.[13] A year later, another source noted that the City of Geneva had "supervised camping grounds... at the north end of Seneca Lake for tourists who carry their own summer homes with them."[14]

By 1928, cabin courts made up a third of the ninety AAA listings for the state. Of these, six courts were listed on US Route 20.[15] Field observations and interviews indicate that up to seven of the ninety-six courts were begun by 1929. The earliest cabins may be at the Cedar Rest Motor Court near Winfield, begun circa 1925.[16]

While tourists could still camp in the 1930s, cabins became more common in the state and on US Route 20. Of the 165 listings for the state in the 1935 AAA guide, thirty-six were for US Route 20 facilities and twenty of these offered cabins.[17] Fieldwork suggests that at least fourteen of the ninety-six courts studied were built between 1930 and 1939. Four courts added cabins incrementally. The largest expansion occurred at Geneva's Blue Spruce Motel (then known as the Chestnut Lawn Cabins). Five original cabins were built in 1930, followed by fifteen more cabins in three stages by 1939.

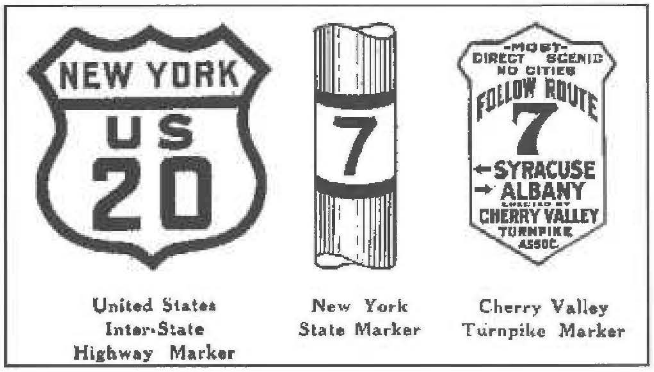
Construction of cabins slowed during World War II. Along US Route 20, at least four facilities were built between 1947 and 1950. Two of these were started by returning servicemen. Three more courts expanded at the same time, and two of these added double cabins.[18] The highway's largest court, the Commodore Cabins near Sharon Springs, attained its ultimate size of twenty-four cabins with the addition of seven in 1949.

New construction of motels eclipsed cabin court building along US Route 20 by the early 1950s. Dozens of period AAA listings describe "a new motel" and "a modern motel" in their entries. Based on interviews, it appears that only three new courts were constructed between 1951 and 1953.[19] The Birx Motor Court near Canandaigua was the highway's last new court, built between 1956 and 1958. A few facilities added double to quadruple units through 1964.

During the 1950s and early 1960s, some free-standing cabins were linked by false fronts or internal connections to create the illusion or reality of motel units. Nine such cases were observed along US Route 20. This type of physical alteration was often accompanied by a name change to suggest modernity. One example is Schodack Center's Twilite Cabins, which became the Twilite Motel in 1955, following the addition of a parapet across five c.1932 cabins.

Location
The location of a court was governed by several factors. These included the location of traffic generators, such as cities; obstacles, such as other cities and congested intersections; and destination points, such as scenic areas, resorts, and cities. The rate of travel and the availability of inexpensive land were also important considerations.[20] In general, courts were located a day's drive between a major city and a major attraction, just before an obstacle.

Courts are found outside of municipal limits all along US Route 20 in the state. There are, however, four areas of concentration. The eight courts remaining near Albany represent the distance of a day's drive from Boston, as well as the importance of proximity to New York's capital city.[21] The concentration of courts surviving approximately twenty to forty-five



Markers identifying the Cherry Valley Turnpike section of US Route 20 between Albany and Syracuse. (Source: The Cherry Valley Turnpike, Waterville, New York: The Cherry Valley Turnpike Association, 1927)

miles west of Albany may be due to the lack of development pressures combined with the attractiveness of Sharon Springs as a spa community in the 1930s. Courts built near Richfield Springs served visitors to the resort community as well as to the region's attractions, such as Cooperstown, a mecca for history and baseball enthusiasts, and Warren, with its small fishing lakes. Finally, the twelve documented courts between Auburn and Geneva served these two medium-size Finger Lake's cities and provided accommodations to travelers exploring the region's parks and historic sites.

The scarcity of courts west of Avon (south of Rochester) reflects the importance of New York State Route 5 as an alternate travel corridor to Buffalo, the region's fewer attractions, and the impact of Buffalo's suburban development, which removed courts. It appears that once travelers left the Finger Lakes, they usually pushed west toward Niagara Falls, Buffalo or Erie, Pennsylvania, as the next overnight stop.

Site and Landscape Characteristics

The best sites for autocamping usually had several acres of high, level ground, shade trees, and a water source such as a stream. For court sites, these elements, as well as the size and shape of the lot, were important.

The majority of the ninety-six courts studied are on level sites, with some on hilltops. Most lots are of five acres or less. The lots are roughly rectangular with the length parallel to the road, offering "frontage enough to allow [the] motorist to slow down and turn [into the court]."[22] Location near a stream was often a necessity for auto camping, but by 1928 piped running water, usually cold, was common. Court operators were urged to introduce fast-growing indigenous trees if they were lacking and to provide "spacious lawns, cool shade from trees and gorgeous flowers to soothe the tired traveler."[23]

The importance of landscape elements is reflected in some of the court names along US Route 20. Catalpa trees are found at Catalpa Garden Cabins at East Greenbush. Lebanon cedars grace the Cedar Rest Motor Court near Winfield. Blue spruce stand at the Blue Spruce Motor Court. Maples survive (while the cabins do not) at the Melody Maples Motel, west of Albany.

Other aspects of the court landscape include the treatment of drives, which were usually unpaved or of gravel, and parking areas, which were informal spots near the cabins directly on the grass lawns. In only one case was an architectural element, a trellis pergola, introduced to enhance the landscape.

Physical Plan

Three major court plans - linear, "U," and "L" - are seen among the highway's ninety-six examples. Fifty-eight courts are of a linear plan. Of these, forty-six are parallel to the road, some approached by a U-shaped drive. Only seven courts are placed perpendicular to the road on narrow lots. Twenty-two courts utilize a "U" plan in the placement of cabins and drives, differing only in the building spacing. Four courts are arranged in an "L." The number of L-plan courts that were later expanded to U-shaped courts was not determined except for one example. Sharon Springs' Commodore Cabins stood in an L-plan for nine years, until a final row of seven cabins was constructed in 1949. Other court plans seen are variations of the linear form, including four courts with cabins placed diagonally to the road, presumably to enhance visibility.

Size of Court
Of the ninety-six courts observed, the number of remaining cabins ranges from one to twenty-four. Over half appear to have always been small enterprises with five or fewer cabins. Only six courts appear to have had eleven or more cabins at their peak. The two largest courts retain their full complement of twenty and twenty-four cabins plus related buildings.

Building Types
The majority of the ninety-six courts documented have one to three other buildings as part of the complexes, although some are modern, unrelated structures. Buildings historically associated with cabins include residences, restaurants, toilet and shower facilities, gas stations (sometimes with groceries), and sheds.[24] The type most frequently seen is the family residence, which often contained the business office. Surviving shower buildings are found at eight courts while restaurants are seen at six enterprises. In only three cases are separate toilet buildings still extant. The only remaining community kitchen is found at Geneva's Blue Spruce Motor Court. This court and Sharon Springs' Commodore Cabins are the most fully developed courts displaying the greatest diversity of associated buildings.

General Cabin Characteristics
As a distinct building type, tourist cabins can be described by size, form, roof form and orientation, building materials, nature and location of openings, and architectural embellishments. These features help define the overall design of cabins and in some instances link them to national trends or architectural styles.

The typical cabin is small, ranging from approximately eight by twelve feet to twelve by twenty feet for a single unit. Double units are approximately twice this size. The tight quarters were sufficient for two twin beds or a double bed, up to two chairs, a bureau, a sink, and possibly a small table. Later modifications included full bathrooms and closets and led to larger cabins. All but one of the cabins observed on the highway are a single story in height. The cabins are rectangular or nearly square (few have four equal sides). The original forms were often altered with rear or side ells when private bathrooms were added, beginning in the mid-1930s.

Rectangular plan cabins generally have side gable roofs with the ridge running parallel to the road. Square plan cabins are often topped by hipped roofs. All roofs are generally of a medium pitch with slight overhangs. In all cases, the roof material is asphalt, either rolled or shingles.

The historic predominance of wood as a building material in the Northeast is seen in the twentieth-century construction of cabins. Ninety-three courts along US Route 20 are of wood frame construction and are sheathed in either clapboards or noveltyboard. Asphalt siding, usually in a brick pattern, appears to be the original sheathing over wood in a few cases. Only three courts feature cabins of concrete slab and block construction, built between 1947 and 1949.[25]

Rectangular openings characterize cabin doors and windows. Entrances are centered or off-center and are often marked by entry porches or overhangs. Original doors are of wood and are multi-paneled, often with a glazed upper panel. Windows usually occur on all four sides of the cabins although the rear elevation may be windowless. In cabins built after about 1940 there may be a small bathroom window. Side elevations usually have a single, centered window. The facade has one or two windows; in the latter case, windows flank a center door. Most of the windows are of wood with six-over-six or one-over-one double-hung sashes. The trim at openings is simple with little decorative molding.

When ornament is found it is usually at the roofline and entrances of the cabins. Fascia boards, rafter ends and, less often, brackets are found at the eaves. Cabin entrances are marked by full-width or small entry porches or hoods. Porch posts are typically unadorned although cabins at a dozen courts feature ornate wooden latticework. Hoods, sometimes supported by large diagonal braces, can also be seen.

The courts along US Route 20 in New York State exhibit stylistic features of one or more broadly defined national trends: interpretations of regional vernacular design; "rustic"; and "exotic/picturesque." Other design possibilities were implemented across the United States during the 1920s to 1950s, but the remaining Route 20 examples emphasize vernacular interpretations of residential design.[26]

"Home" was the key image for cabin design. One author, describing the national scene, remarked on the proliferation of "neat little dwellings with perhaps a screened porch."[27]

Among the earliest courts is the Cedar Rest Motor Court, Winfield, which began c.1925 with the two single cabins in the center and is still open. (Photo: I. Vasiliev)

The Catalpa Garden Cabins, East Greenbush, began c.1930 and grew to five single and two double cabins by 1948. Closed 1982. (Photo: circa 1960, Collection of F. Ingles)

Twilite Motel, Schodack Center, begun c.1932 and still operating. (Left to right) Original cabins linked by false front in 1955 to create a "motel," garage (c.1948?) and three single cabins built c.1939. (Photo: I. Vasiliev)

The largest court, the Commodore Cabins, was begun as a gas station in 1929 with the first eight cabins and a shower house built 1931-1932. Moved to this site west of Sharon Springs in 1938. Sixteen cabins were built between 1936 and 1949; the court closed c.1966. (Photo: between 1941 and 1947, collection of A. Handy)

U-court plan with single and double cabins in a wide crescent. Birx Motor Court (1956), near Canandaigua. (Photo: Collection, T. Werbizky)

Later, in 1928, another writer commented on travelers in the Northeast discovering "the real convenience of `their own cabin home' with its home-like privacy."[28]

Almost all of the ninety-six cabin courts along US Route 20 embody vernacular characteristics of late nineteenth and early twentieth-century residential design in the region.[29] The cabins, with their wood frame construction, gable roofs, double-hung sash windows, porches, and spare roofline ornament, resemble miniature residences, literally "homes for the night." The owners' residences, gas stations, and restaurants seen at the courts also generally display characteristics associated with period residential design.[30]

Rustic design, with its emphasis on indigenous natural materials such as log and stone, is associated with the construction of buildings used for recreational purposes. No log tourist cabins were identified in this study, but a few US Route 20 courts display elements of rustic design. The use of half logs as sheathing is found at the Log House Lodge in Sharon Springs, the restaurant of the Old Orchard Tavern near Pavilion, and at one other court. The only use of rough native stone is as facing on the cabins at the Twin Swans Motel in Avon.

The term "exotic/picturesque" embraces the many unique forms court buildings took across the country including tepee cabins and Dutch windmill restaurants.[31] The latter is seen in one

instance, the former office building of the Windmill Tourist Camp near Seneca Falls.[32] The only other picturesque example is the former c.1925 gas station at the Paradise Tourist Station near West Winfield. Now used as a sales building, it features a steeply pitched roof and wall dormers that recall Tudor Revival design of the period.

Conclusion

The ninety-six courts documented along US Route 20 exemplify court development of the late 1920s to the early 1950s. Their initial establishment and later activity reflect the broad national trends in tourist accommodation, as well as the fortunes of this particular highway. When the New York State Thruway bypassed US Route 20, cabins had already fallen out of favor. The period of neglect and demolition of cabin courts began by the mid-1950s and continues today.

Eleven courts were demolished during the seven years of this study. Only nine courts continue to operate.[33] Of these, six have older owners, and in most cases, there are no interested family members to continue the trade. Business is usually described as marginal and is carried by a few good summer months. Fifty-five courts are closed. Reuse of a court's cabins has occurred in only eighteen cases.[34] These facts suggest that all of the remaining courts could be gone in about forty-five years, less than the time span generally employed for determining properties to be significant.

If any of the operating courts of US Route 20 are to survive, or if others are to reopen, the owners will need to maintain or upgrade the cabins to provide safe, clean, and modern facilities without sacrificing character. Rates are already competitive, at about two-thirds of motel chain prices. Promotion of the cabins on the historic highway is a logical approach, given the growing national interest in heritage or cultural tourism. Highway booster groups, active at the beginning of automobile travel, are reemerging in western states and could serve as models for US Route 20. Although cabins present limited opportunities for new uses, sensitive reuse examples do exist.[35] When continued use or reuse is not possible, remaining courts should be documented, particularly while early owners and operators are available as primary sources. Although none of the US Route 20 courts are included in the National Register of Historic Places, several appear to be eligible for listing. Unless these and other efforts are made soon, further generations will neither experience nor understand cabin courts in the appropriate historic context. At present, this short-lived but important manifestation of the influence of the automobile on American culture, so well represented on historic US Route 20 in New York State, is in danger of being lost forever.

Notes

[1] Henry Schmidt Jr., "Overnight Rest-Cabins Spreading," *The Library Digest* (9 June 1934), 40.

[2] For a discussion of the origins and importance of the publication, see Dwayne Jones, "Sources and Resources: Tourist Court Journal," *The Society for Commercial Archeology News Journal* 12, no. 2 (Fall 1992), 21-22.

[3] *Motor Courts and Drive-Ins* (New York, New York: Ahrens Publishing Company, n.d.), 3.

[4] The listings of the annual AAA guides are very useful for succinct, detailed descriptions of individual courts but may represent only about one out of every twelve courts operating in the nation the 1930s and early 1950s.

[5] George Canton, *Where the Old Roads Go* (New York, New York: Harper and Row, 1990), 235. This statement excludes the present Interstate Highway System which is not considered an "old road." The other bicoastal road is the Lincoln Highway.

[6] *The Cherry Valley Turnpike* (Waterville, New York: Cherry Valley Turnpike Association, 1931), 1.

[7] Hilda Watrous, *The Country Between the Lakes, A Public History of Seneca County, New York, 1876-1982* (Waterloo, New York: K-Mar Press, 1983), 278-279.

[8] Ibid., 296.

[9] Paul Freidlander, "Alone on Route 20," unidentified newspaper, 1955, unpaginated personal papers of Laurence B. Ban Atta, West Winfield, New York.

[10] Roy, Gallinger, "Route 20 Assn. to Ask Road Name Be Changed to State Freeway," *Oneida Daily Dispatch* (6 November 1955), 12.

[11] U.S. Route 20 Association, press release, 17 June 1955. The two-page release was sent to sixteen newspapers between Albany and Auburn.

[12] *Official Camping and Camp Site Manual* (Washington, DC: American Automobile Association, 1924-1925), 108-109.

[13] Ibid., 109.

[14] "Proof that 'See America First' is Gaining Ground," *Finger Lakes Topics* (3 July 1931), 5.

[15] *Official AAA Camp Directory* (Washington, DC: American Automobile Association, 1928), 92-96.

[16] Other early cabins are at the Skyview Motor Court (Town of Sharon, pre-1929), Otsego Hills Motel (East Springfield, begun circa 1926), Paradise Cabins (West Winfield, circa 1925-1926), Cass Wayside Motel (Geneva, begun circa 1926 and

demolished in 1988), and possibly the Brookside Cabins (Nelson, pre-1928), and Folkes' Cabins (Altamont, circa 1927-1930).

[17] *AAA Directory of Motor Courts, Camps and Inns* (Washington, DC: American Automobile Association, 1935), 42-48.

[18] Tierney's Cabins (near the Massachusetts border) and the Otsego Hills Motel (East Springfield) added double cabins.

[19] These are the Anchor Motel (near Auburn, 1951-1952), the Swiss Chalet (near Seneca Falls, circa 1953), and the Whispering Winds Motel (near Auburn, begun 1953).

[20] These factors are discussed in detail in Geoffrey Baker and Bruno Funaro, *Motels* (New York, New York: Reinhold Publishing Corporation, 1955), 136. The historic rate of travel is described in Warren Belasco, *Americans on the Road, From Autocamp to Motel, 1910-1945* (Cambridge, Massachusetts: The MIT Press, 1979), 23, 132.

[21] Although there may have been courts within the City of Albany along US Route 20, Madison and Western Avenues, none appear to survive based on the fieldwork.

[22] *Tourist Court Plan Book* (Temple, Texas: Tourist Court Journal, 1945, reprinted 1950), 72. Too small or narrow a site or one on a sharp curve meant decreased visibility.

[23] Ibid., 43.

[24] Although courts did have garages in some regions of the United States, no examples are seen on US Route 20 in New York State. Only the Whispering Winds Motel near Auburn features car ports attached to the cabins arranged in a "U" plan.

[25] The examples are the last seven cabins at the Commodore Cabins (Sharon Springs), three double cabins at the Greenwood Motor Court (Madison), and six double cabins at the Anchor Motel (near Skaneateles).

[26] For a discussion of the aesthetic features associated with tourist courts and motels, see Mary Ann Beecher, "The Motel in Builder's Literature and Architectural Publications," Jan Jennings, editor, *Roadside America, The Automobile in Design and Culture* (Ames, Iowa: Iowa State University Press, 1990), 117-120. In her review, Beecher suggests six specific thematic categories for tourist cabin design grouped according to two broad trends, "contemporary" and "historic" design. Contemporary design includes the "bungalow theme" and the "modern theme." Historic designs include "rustic," "colonial," "south-western," and "western." This categorization, which Beecher terms "characteristics of the six motel aesthetic systems used for the design of motels between 1930 and 1955," appears to be the only organization of aesthetic and stylistic features associated with tourist cabin courts offered to date.

However, there are some difficulties with this system. A shortcoming is that the terms used in this system do not relate directly to stylistic terms commonly used by architectural historians to describe architectural qualities of other building types of the period. Also, tourist courts created from reused materials as well as those of picturesque forms - tepees and windmills - cannot be easily included in Beecher's system.

[27] Frank E. Brimmer, "Outdoor Hotels," *Woman's Home Companion* (July 1928), 20.

[28] "Editor's Page." *Tourist Court Journal* (June 1938), 20.

[29] Examples which exhibit domestic design qualities include the Twin Swans Motel (Avon), the Birx Motor Court (near Canadaigua) the Blue Spruce Motor Court (near Geneva), the Elms Motel, Cabins, and Rooms (Seneca Falls), the Cedar Rest Motor Court (near Winfield), and dozens of others.

[30] A very few examples of other designs were noted. The diner at the Starlite Diner and Motel (Westfield) features a curved entry vestibule suggesting Streamline or Art Moderne design. The crisp machine-like lines and corner windows which help identify the International Style are present in only one set of cabins, The Whispering Winds Motel (near Auburn, circa 1953).

[31] Picturesque forms were also achieved through material recycling and structure reuse. For a brief description of an Ohio camp constructed of "two score [oak] casks," see Frank E. Brimmer, *Woman's Home Companion* (July 1928), 20. For a brief description of "Motel 66" built of railroad cars, see Phil Patton, *The Smithsonian* (March 1985), 130.

[32] The court was established in the 1930s and has lost all but two cabins. The windmill building serves as the office of the Seneca County Chamber of Commerce. The court is illustrated by a reproduction of a postcard in John Baeder, *Gas, Food and Lodging: A Post Card Odyssey Through the Great American Roadside* (New York, New York: Abbeville Press, 1982), 91.

[33] These are: The Anchor Motel, the Birx Motor Court, the Cazenovia Motel, the Cedar Rest Motel, the Otsego Hills Motel, the Pine Haven Motel, the Twilite Motel,the Twin Swans Motel, and the Whispering Winds Motel.

[34] Typical reuses are for permanent housing (generally sub-standard), commercial enterprises, sheds, and playhouses.

[35] A housing project that preserves building integrity is presented in Bonnie J. Halda, AIA, "Historic Garage and Carriage Doors: Rehabilitation Solutions," *Preservation Tech Notes* (Washington, DC: National Park Service, US Department of the Interior, July 1989).

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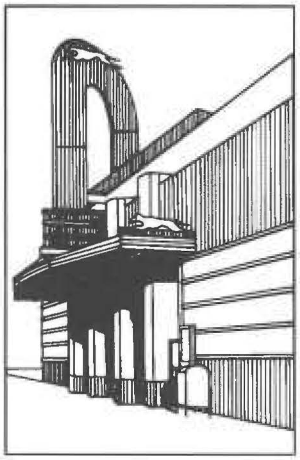
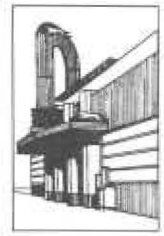


Communities in Context



The Bias of Culture: When Does a Community Come of Age?

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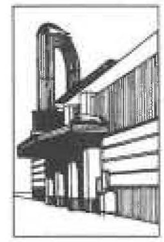
Abstract
Although explorers made landfall in Florida as early as the sixteenth century, the state is actually among the youngest in the nation in terms of its development. While the Colonies were aspiring to democracy and self-rule, Florida was little more than a stopping-off place for expeditions and armies in pursuit of riches and the source of youth. Mosquito-infested backwaters, treacherous reefs, hostile native Americans, and foreign vegetation and language, provided no reference point of familiarity for those early settlers.

In South Florida (the area defined by the megalopolis of Dade County), sporadic development in the 1890s led to what was to become a statewide phenomenon - the land boom and subsequent crash that began in the 1920s. Virtually every major city in South Florida, including Miami, Coral Gables, Hialeah, Opa-Locka, Miami Springs, and Miami Shores began their meteoric growth in the opulent 1920s. Theme developments based on romantic images consistent with this tropical paradise were capitalized upon, and ushered in a realm of "fantasy architecture" never before experienced in America.

The City of Coral Gables is recognized as the most fully-realized theme community in the state. The National Register of Historic Places nationwide standard of historicity (i.e., a property must be at least fifty years old to qualify as significant) fails to recognize the evaluation of younger cultures such as these. The general application of this standard negates the "sense of place" that has been achieved by these newer communities. As a consequence, deserving properties are frequently victims of this institutionalized age bias. Two specific case studies - the Miracle Mile Theater, built in 1948 and a downtown historic landmark; and St. Mary's Missionary Baptist Church, built in 1953 and located in a Black historic district - are used to argue and develop the need to consider the intrinsic contextual framework of a youthful community *before* applying any exclusive standard meant for nationwide application.



Assessing Significance and Preservation Value in Waikiki

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The Waikiki Biltmore Hotel, upon its completion in 1955, was the tallest building in the Territory of Hawaii. It was the scene of many memorable moments, but none was more memorable than the morning of May 28, 1974, when in a matter of a minute and thirty-seven seconds the twelve-story, two hundred thousand-ton building was converted into a pile of rubble. David Martin, the demolition expert responsible for its implosion, commented, "It's the newest thing we've taken down. You just don't see a 1955 coming down."[1] Aloha! Welcome to Waikiki!!!

The dramatic destruction of the Biltmore Hotel speaks to the difficulties facing preservationists in Hawaii when it comes to issues of the recent past. One of several International Style hotels to climb above the low- rise skyline of Waikiki in the mid-1950s, the Biltmore remained on the landscape a scant nineteen years before giving way to the 1,260-room Hyatt Hotel, whose mortgage interest payments alone ran over one thousand dollars an hour.[2]

The "problem" with Waikiki is that since the introduction of jet service to Hawaii, change within the district has been continuous, and is still occurring. Unlike other famous resorts, ranging from eighteenth-century Bath in England to Miami Beach's famous Art Deco district, Waikiki's development is not neatly bounded. Bath, for example, began as a resort as early as the sixteenth century. However, most of the development occurred between 1780 and 1810, leaving a uniform and aesthetically cohesive assemblage of buildings, parks, streets and public institutions.[3] After 1840 the city became unfashionable, as British leisure-time interests shifted to the seaside and new forms of entertainment replaced the social round of Bath. Similarly in Miami, the modest Depression-era fantasy resort of South Beach was pushed aside for newer development at the north end of Miami Beach - the Fountainbleau and other larger hotels of the 1950s and 1960s - and then by changing tourism interests and opportunities elsewhere, including Hawaii![4] Both Bath and Miami were left to be rediscovered at a later time. Neglect, once again, served as the best preserver.

Waikiki has experienced no true hiatus. With the introduction of jet service to Hawaii, the visitor industry has moved forward and not looked back. By 1967 its earnings had surpassed those of sugar and pineapple combined, and since 1972, when visitor spending overtook defense spending in the Islands, the visitor industry has been Hawaii's number one generator of revenues. In advancing to the top of the economic ladder the industry has literally obliterated Waikiki's past. The older, court type hotels, smaller bungalows, and low-rise apartment complexes dating principally from the

1920s through the 1940s have been demolished to make way for the new development, and 1950s and 1960s buildings have been either swept away or adapted and "modernized" to keep pace with newer hotel and commercial changes.

The public hardly considers the range of 1950s and 1960s, and especially early 1970s, highrise buildings for their historic value. Their significance, moreover, is as yet far from sorted out. They are obviously significant, and perhaps exceptionally significant, for their role in Hawaii's recent history. But is this sufficient reason for considering their preservation, or must they be significant beyond this major, albeit limited, context? For example, in order to convincingly argue for the preservation of the seven-story Edgewater Hotel (1950) need more be mentioned than it is the first International Style hotel built in Waikiki and the district's tallest building until the advent of the Biltmore? Need the twelve-story Rosalei Apartment Building (1955) be more than the first high-rise apartment in Hawaii? And what about buildings designed by "lesser" architects, who may at some point be considered more significant; or "lesser" buildings by more important architects and firms, which may at some point be considered essential elements of their *oeuvre*? Usually time and attrition help to make these judgments. However, with Waikiki's land values still escalating it is left to preservationists of today to make at least some preliminary judgments, as in fifty years there may be no judgments to make.

The State of Hawaii's Historic Preservation Division, in cooperation with the Historic Preservation Program at the University of Hawaii, is in the process of developing a set of contexts with which to better evaluate buildings and other features of significance in the Waikiki area. This follows upon earlier, less systematic attention to the area by the state office, which included a number of National Register nominations of both individual properties and more encompassing thematic nominations such as those for Tudor cottages and fire stations.

At this point, the context project is in many ways an academic exercise, both figuratively and literally. The nationally developed context or theme-based program for understanding and evaluating resources, in fact, is proving quite useful in placing properties together and giving cohesion to an often seemingly disparate set of properties. Overall, the contexts are local (or statewide) ones, although there are some properties with obvious links to national contexts, such as the several military properties in the Waikiki area or Buckminster Fuller's aluminum geodesic dome (1957). Although there will be obvious limits to what can be done with the list once it is completed - many of the properties, for example, will be considered too recent in date to nominate even with a liberal interpretation of the criteria considerations - nonetheless, with completion of the contexts and compilation of a complete inventory, we will at least know what still exists and what is likely to be considered important in the not-too-distant future. What we will not have, as least at this point, is a strategy in place for preservation of these identified resources.

To develop any sort of preservation strategy, people involved with the preservation of Waikiki must move beyond merely identifying significant properties. The recent history of Waikiki has centered on change. There is no reason to think that this trend will abate, with the construction of a new convention center to commence in the summer of 1995. To be effective, preservationists will need to know where and when to fight their battles. A system is needed not only to evaluate significance, but more importantly, "high preservation value."

Before setting out the proposed strategy for assessing high preservation value, it might be useful to trace Waikiki's history, citing some of the most prominent and representative features of the built environment that still remain, as well as touching upon some of the principal contexts identified so far.

Waikiki has undergone five major transformations in the last two centuries. It served as a traditional seat of power for the island of Oahu from the mid-1400s until 1809, when Kamehameha I moved his court to Honolulu, a natural deep draft harbor that provided a haven for western ships. This move, coupled with a precipitous decline in the Hawaiian population, led to Waikiki becoming a backwash of civilization, or to use Twain's words, "historic Waikiki." From the 1860s onward the district emerged as a popular ocean-side retreat, a day use recreational area that existed side by side with the revival of wetland agriculture by the Chinese. With the completion of the trolley line to the beach in 1904 and the destruction of the wetland agricultural fields in the 1920s, Waikiki became an increasingly resort-oriented, suburban residential area. From the mid-1950s onward it

has developed into an urban resort that now attracts more than 4.5 million visitors a year.

Few pre-twentieth century surface remnants remain in Waikiki. Sub-surface archaeological materials do exist and both the State Historic Preservation Office and the City and County of Honolulu's Department of Land Utilization, which administers the Waikiki Special Design District ordinance, are sensitive to the need to record any information. The scant extant surface features derive their significance from legendary accounts. The Wizard stones of Ulukou are the tangible remnants of four soothsayers who came from Tahiti and settled here prior to 1400. These unsexed healers transferred their powers into these rocks and then vanished. The Helumoa coconut grove on the grounds of the Royal Hawaiian Hotel is associated with the reign of Kakuihewa, who started this grove in the late 1500s, when the phantom rooster, Ka'auhelemoa, appeared before him and scratched the ground. The *ali'i* (high chief) commanded a coconut be planted at that spot, which eventually developed into a royal grove of over 10,000 trees. The stand now has less than twenty-five trees. Such are the connections of modern Waikiki to its distant past.

Nothing remains above ground to denote the period of virtual abandonment, and aside from various street names, little remains to remind the populace of the area's role as a nineteenth-century oceanside retreat. Such street names as Helumoa, Uluniu, Kealohilani, Paoakalani, and Kaiulani can be associated with royal retreats; Saratoga with a bath house, Lewers with a haole household, and Tusitala with Robert Louis Stevenson.

The recently rehabilitated Moana Hotel (1901) stands as the oldest building in Waikiki. Built on the heels of the United States' annexation of Hawaii as a territory, it was Waikiki's first successful hotel endeavor, and the third attempt at establishing a seaside hotel at the beach. Today it is dwarfed by the successful visitor industry it anticipated.

Other turn-of-the-century Waikiki hotels such as the Seaside, Waikiki Inn, the Hau Tree, and the Pierpoint were characterized by a cottage atmosphere. These have either disappeared with time or were consumed by more ambitious hotel projects during the 1920s and 1930s. Despite a seeming boom in hotel openings in Waikiki during the first decade of the twentieth century, the 300-room Alexander Young Hotel, situated in downtown Honolulu, boasted more hotel rooms than all of Waikiki.

The construction of the Ala Wai canal in the early 1920s presaged a dramatic shift in the Waikiki landscape. The canal diverted the three major streams that ran through the district. In turn this led to the demise of the wetland agriculture and duck farming that dominated the area, and banished the voracious mosquito from the ocean front. The subdivision and suburbanization of Waikiki followed, and Hawaii's first world class hotel, the Royal Hawaiian (1927) appeared on the scene. The presence of the hotel coupled with the construction of the *Malolo*, the world's fastest ocean liner, and the improvement of Honolulu harbor, including the erection of Aloha Tower, led the *Honolulu Advertiser* to declare by 1938 that Waikiki had made the "transition from a once rural community into a smart center visited and enjoyed by the great and near great of the world."[5] Shirley Temple would come to the Islands and be greeted at the docks by 10,000 people; Mary Pickford, Carol Lombard and many others would honeymoon at the Royal; Bing Crosby would stay at the Royal to gain inspiration for his movie, *Waikiki Wedding*; and George Bernard Shaw and Charlie Chaplin would run into each other at the pier and have lunch in Waikiki at Lau Yee Chai, "an elaborate and ornate chop suey house."[6]

Other establishments that supported the glamour of the district were S. & G. Gumps (1929), which specialized in *objets d'art* from the East and West, and the Waikiki Theater (1936), which locals recall as the theater that required the wearing of shoes. These still remain along Kalakaua Avenue, but in transmogrified forms. The interior of the latter was gutted following the Hawaii Historic Places Review Board's 1979 rejection of its nomination on the grounds that the building was neither over fifty years old nor of exceptional significance.

World War II brought thousands of servicemen to the Islands, and they returned to the mainland with glowing tales of paradise. Ukulele-strumming Arthur Godfrey reinforced this image via the television, and the Academy Award-winning *From Here to Eternity* (1954) instilled into the American psyche visions of moonlight grappling, *a la* Burt Lancaster and Deborah Kerr, on Hawaii's shores. Visitation to the islands increased and by the mid-1950s hovered around the 100,000 mark. In 1955 the Waikiki Biltmore Hotel, Rosalei Apartments and Princess Kaiulani

Hotel succeeded each other as the tallest building in the territory in a matter of less than six months, marking the commencement of Waikiki as an urban resort.

The impetus for new development was accelerated in 1959 when the jet airplane reduced the flight time to Hawaii from the west coast from an uncomfortable and often unreliable twelve hours to five hours. That year also saw Hawaii admitted as the fiftieth state, the publication of James Michener's *Hawaii,* and tourism jump to a quarter of a million people. Also in that year, Matson Navigation Company made one of the largest corporate blunders in the history of Hawaii, divesting itself of its hotel properties in Waikiki: the Moana, the Royal Hawaiian, the Surfrider and Princess Kaiulani for $17.65 million. Within five years Waikiki hotels were virtual money-making machines, with visitation to Hawaii passing the half million mark in 1964. In 1980 this figure had escalated to four million, and by 1990 had passed seven million.

And building in Waikiki kept pace with the demand. In 1962, *Paradise of the Pacific,* a local magazine, urged Hawaii business leaders to show visitors "why Hawaii is a better point-of-call than Miami, Las Vegas and Cannes, . . . not why it is as good as Tahiti."[7] In the next thirty years Waikiki has consciously done precisely that.

In 1955, the *Honolulu Advertiser,* on the opening of the 350-unit, ten-story Reef Hotel, speculated that someday Waikiki might be able to support a 700-room hotel. By 1962 the construction of the Reef Tower and its addition expanded the capacity of the Reef to 883 rooms. By 1986 the fifty square blocks of Waikiki included five hotels with inventories in excess of 1,100 rooms, with the Hilton Hawaiian Village offering 2,612 rooms.

An exponential explosion in carrying capacity is but part of the tale. The breaking of world records for construction achievements and a "bigger is better" attitude reigned as dominant values within the district. Thus Saint Augustine's Catholic Church (1961) was the largest church in the Islands when built; the Rainbow Tower at the Hilton Hawaiian Hotel (1968) incorporated the tallest tile mural in the world; the Pacific Beach Hotel's indoor oceanarium (1979) was the largest in the world; and the Discovery Bay McDonald's brass and koa interior (1978) was the most expensive in the chain.

These facets all add up to excitement, a dynamic high energy flow, and a sense of today on the edge of tomorrow, resulting in Waikiki's having shed its past just as a lizard sheds its skin. The district exists for today, a totally modern, upbeat urban center in the mainstream of contemporary excitement and trends. Continually renewing itself, Waikiki is, to use Wordsworth's words,

> *. . . a phantom of delight*
> *A lovely apparition, sent*
> *To be a moment's ornament.*

Here the 1950s is ancient history, much of it already destroyed, and the few remaining elements such as the Hilton Hawaiian's Buckminster Fuller geodesic dome (1957), the Waikikian Hotel with its hyperbolic parabaloid roof (1956), and the Canlis Restaurant (1953) with its "modern" tropical ambiance are nostalgically clutched at as reminders of a gentler time. Citizens' groups have proposed registration of these structures, for they know these are not long for this world. Similarly, once trendy projects such as the Ala Wai Apartments (1953), the Waikiki Circle Hotel (1963) or the Tree House Apartments (1961) no longer seem to glow with the hopes of the radiant city, and border upon becoming architectural curiosities of that long-ago era, the 1960s. Less daring, more mundane designs such as the Foster Tower (1961) passively occupy space in the streetscape, blending into the blur of sensory overload, despite the fact that at its completion the press declared it to be, "a bright episode in the colorful history of mushrooming Waikiki."[8]

In comparison, many of the technological "innovations" of the period seem to have a more eternal character. The glass elevator at the Ilikai Hotel (1963), which its developers claimed would give ten views "that had never been seen before" for every one the building eliminated, still imparts a forty-two second thrill. Similarly the Top of Waikiki revolving restaurant (1965) provides a panorama of the city, as well as reminding people of the fair-like atmosphere of Waikiki. Pro Park's eight-story stack garage presents a more straight-forward, but entrancing utilization of technology.

More recent hotels such as the Hilton's Rainbow Tower (1968), Queen Kapiolani (1969), Waikiki Sheraton (1971), Hawaiian Regent (1971), Hale Koa (1975), and Hyatt Regency (1976) attempted to integrate a slick contemporary look with a tropic atmosphere. A 1974 Special Design District ordinance provided for landscaped

setbacks and density controls. While complying with these regulations, the more recent buildings such as the Halekulani (1984) and Hawaii Prince (1990) hotels and such condominium offices and apartments as the Diamond Head Vista (1975), Canterbury Place (1976), and the Waikiki Trade Center (1980) have embodied the sleek finish of today, further contributing to the flash of this urban resort. In 1991, the City Council enacted a moratorium on further hotel and apartment building in Waikiki, which led to the development of a number of small scale shopping complexes, often incorporating 1930s housing stock. A project such as Kyo-Ya Restaurant (1992) is rare. Other owners sit with vacant lots, awaiting the right moment to once again commence construction.

Few Waikiki buildings have been viewed as historic, with the exception of the Moana Hotel (1901), subject of a fifty-million-dollar investment tax credit project undertaken by Kokusai Kogyo Corporation of Japan in 1988, and the stalwart Royal Hawaiian Hotel (1927). Less prominent buildings, including frame houses and the comfortable and often whimsically detailed smaller hotels and apartment building of the 1930-1950s are for the most part ignored, as are more ephemeral commercial outlets, including pornographic shops, fast food restaurants, and T-Shirt vendors. Similarly, the major buildings of the past thirty years are viewed as too new, although it is upon their foundations that Hawaii's visitor industry has been built.

This provides some idea of needs to be addressed in Waikiki. How we are to sort through this complex array of buildings, building remnants, and other features to pick out those properties that *must* be preserved remains another problem. Criteria are needed that could be applied on a planning level to identify properties worthy of preservation or at least that could be justified in terms of economic and social costs.

What is proposed is just such a system for evaluation. Some elements can be borrowed from the existing structure of the National Register program and its guidelines; other elements must be tailored for local application in Waikiki and Hawaii. What is hoped for is a model that can be used to mediate between the somewhat abstract principals of the National Register program and more acceptable language and thinking for Hawaii's broader public.

Overall, we have come up with six areas of consideration in an attempt to evaluate high preservation value. These include integrity, uniqueness, rarity, a work of an outstanding designer, condition, and the existing level of public recognition. There are several other areas that might be considered, including innovative technology or materials, and a site of an important event or place associated with a significant figure. These different areas are approached as follows:

Integrity: Integrity is well defined by the National Register program, although elements within what are considered the various aspects of integrity remain somewhat unclear, especially to the lay person. "Feeling" and "association," for example, are difficult to define. By and large the issues of "design" and "material" integrity are relatively easy to understand and translate to the public. As such, they are the aspects most frequently considered. "Setting" and "location" have less application for Waikiki, where buildings rarely enjoy their original setting or, conversely, have rarely been moved. For Waikiki setting must be viewed in its most liberal light; as with a planted landscape, it is continually evolving, growing. Details, such as existing buildings, change with time, but the sense of vacation and celebration remain constant.

Uniqueness: Uniqueness is a concept most members of the public can be brought to comprehend. The proposed sale of St. Augustine's Church (1961) in 1988 to Hama Kikaku Company of Tokyo for forty-five million dollars, a staggering nine hundred dollars a square foot for the property, was successfully averted using arguments contending that the "copper roofed landmark" was a symbol of the Catholic Church in Waikiki, an historic site occupied by the church since the 1830s. These arguments, placed in the form of a petition with 9,000 signatures, personally delivered to Rome, prevailed in the face of the Bishop's offer to house the congregation elsewhere in Waikiki, which would still have netted the church a twenty-five million dollar profit.

Rarity: Rarity, like uniqueness, enjoys a broad level of public recognition and acceptance as important to the value of a property. The preservation value of building types that are in danger of disappearing from the landscape escalates as their number dwindles. The walk-up apartments and smaller courtyard hotels of Waikiki are rapidly vanishing from the scene, with less than five examples of each remaining. With each successive demolition, these types are

increasingly viewed as rare and pressure may yet be brought to bear to preserve them. Rarity is viewed as a key element for promotion of value to the public.

Work by Outstanding Designer: Many Hawaiian architects, as well as Mainland architects practicing in Hawaii, have attained what might be labeled as "name recognition value." Developers are aware of the cachet of designers' names for selling their product; many wealthier homeowners, many of whom are also opinion makers and business and political leaders, know the names of the architects of their homes. Support from the local American Institute of Architects (AIA) chapter as well as from landscape architects and other professional organizations can be expected, focusing, as this aspect does, on the recognition of the value of their professions. For example, Vladimir Ossipoff is acclaimed as the premier architect practicing in post-war Hawaii. His reputation was established through numerous residential commissions undertaken during the 1950s. His Outrigger Canoe Club (1964), in many respects a large scale Ossipoff house, has high likelihood of preservation thanks to its associations with the architect. Unfortunately such an association was insufficient to save Waikiki McInerney store (1953), which fell to the wrecker's ball in 1977. Time will tell if the aura of the name of C.W. Dickey, Hawaii's leading architect during the 1920s and 1930s, can preserve the two Alexander residences at the foot of Diamond Head, which are on the market for twenty-three million dollars.

Condition: Often confused with integrity, condition refers to the realistic potential of a property for preservation. Condition is understandable and can, in part, be quantified by professionals (although, of course, the results of evaluations can be twisted considerably). Condition has wide acceptance as an element of high preservation value and is generally accepted as a yardstick for assessment. A property in poor condition, for example, presents itself as one that might justifiably be demolished; one in excellent condition could be less easily dismissed. In future years, preservationists may be confronted with much difficulty in preserving highrises of the past forty years. These structures and their complex infrastructures require considerable maintenance.

Existing Level of Public Recognition: Some buildings are simply better recognized than others by the general public. This is certainly not an impartial measure of preservation value, but definitely is one that reflects current public opinion. When the property owners opposed the nomination of the Royal Hawaiian Hotel (1927) to the Hawaii Register of Historic Places, fifteen thousand people signed a petition in support of the nomination. Although the Hawaii Supreme Court struck down the Review Board's action to list the property, the only changes the owner has made have been to enhance the property.

Innovative Technology or Materials: As with "rarity" or "the work of an outstanding designer," the public may generally understand the value of such qualities in buildings. Inventiveness, modernization, etc., are concepts imbedded in the notion of technological advance. The thirteen-story Lutheran Retirement Home (1962) was the tallest lift-slab building in the world when constructed; similarly Ossipoff's Diamond Head Apartments (1956) was the first multi-story building to utilize prestressed concrete beams, a technology developed in Hawaii by engineer Alfred Yee.

Important Events or Places Associated with Important People: This is a category that may best be used to reinforce another point of preservation value. The War Memorial Natatorium (1927) is significant as a living memorial to Hawaii's World War I dead and as the state's only salt water pool. In addition, however, it has strong associations with Olympic swimmer Duke Kahanamoku, and also Johnny Weismuller, later of Tarzan fame, who set world records in the pool's inaugural meet. Similarly, the Hyatt Regency Hotel (1974) might be considered to have high design merit, and well represents the work of the Honolulu based firm of Wimberly, Whisenand, Allison, Tong & Goo, who have attained an international reputation in the area of resort design. In addition, the hotel can also be associated with mega-resort developer Chris Hemmeter, as this was his first venture into hotel development. However, it might be difficult to argue convincingly for the preservation of a hotel simply because it was associated with Roy Kelly, Waikiki's premier hotel developer who built a hotel a year for more than twenty years. His company today still manages twenty rather straight-forward, moderately priced hotels, whose 6,500 rooms comprise approximately twenty percent of Waikiki's stock.

The six key and two auxiliary factors listed here provide an outline for the assessment of high

preservation value for particular properties in Waikiki, as well as elsewhere in the state. These factors elevate the criteria for assessment of significance out of a strictly intellectual realm into the more practical domain of public consideration, at least in the Hawaii context, in which taste plays a major role. Based on inventories compiled through the National Register-devised system of ascertaining significance, the high preservation value criteria provide preservationists with a method for making decisions about protection, or at least about which properties to support for preservation. The system proposed also offers a rationale for gaining public support.

Richard Longstreth in a recent article questioned the role that "taste" played in assigning value to older properties.[9] His argument was that the more disinterested apparatus of professional history offers a better avenue for discrimination of worth. Unfortunately, preservationists are forced to work within the realm of public sentiment and opinion. Older buildings are typically seen as more important, as are more decorated ones, or those designed by better recognized architects, and so on. In Waikiki we are making a plea for the recognition, and eventual preservation, of more recent architecture. In so doing, pragmatism must weigh into the equation.

It is perhaps better to have the chance to preserve the artistically unified, pristine, or exceptional than to go down in flames attempting to save the typical, the representative, or the messy and ugly, however much we might value the latter and appreciate its fine points. In Waikiki the priority will be given to saving the best, which in part means what the general public will accept, at the risk of distorting the historical record. Context-based research over the long run may help to improve public recognition, and therefore preserve a better cross-section of history.

There remain a number of problems in the proposed approach for identifying high preservation value. A number of issues need to be resolved, such as how to determine who will be considered important architects in the future. Also, the definition of integrity may have to accommodate the penchant to remodel Waikiki's existing buildings on a fairly regular basis. Thus, marginally interesting 1950s International Style buildings with outstanding interior decors of more recent vintage might be considered significant more for their modifications than for their original design. Conversely, evaluation of an outstanding modern building might be tempered by injudicious alterations.

Waikiki is a place of the present, and, in an important sense, of the future. As preservationists, we are concerned that elements of the area's development be preserved as a record and to ensure variety and contrast, if nothing else. What the future will bode, of course, remains unknown. One vignette from the past well illustrates this fact.

In September 1925, the County Board of Supervisors amended Honolulu's Building Ordinance by raising the legal height limit from 75 to 150 feet in order to accommodate the construction of the proposed Royal Hawaiian Hotel with its campanile. This action was passed against the advice of the City Planning Commission. City Planning Engineer Charles R. Walsh declared:

> The [Planning] Commission does not believe that skyscrapers are consistent with the typical Hawaiian beauty we are so anxious to conserve.
>
> We preach and in all our descriptive literature elaborately state that Honolulu is different from our American cities, yet we are rapidly becoming the same kind of city as every other American urban center. All our unusual and strictly Hawaiian aspects are being absorbed into typical American dollar producing enterprises. Wherever the difference of a few dollars is concerned for the benefit of business development over what we term our natural beauties, there is no longer any argument as to which features will be favored. . . . There is no doubt that the management of tall hotels and office buildings can be somewhat more efficient than on lower structures of the same floor space. But efficiency of private enterprises carried to the point of public detriment should not be permitted.[10]

We continue to hear the same claims today about much of Waikiki. More than likely such pronouncements will still be made fifty years from now. However, we wonder what buildings will be pointed toward as reminders of a smaller scale, and whether we should start to preserve them now.

Notes

[1] Information on the demolition of the Waikiki Biltmore Hotel may be found in the *Honolulu Star Bulletin* (28 May 1974): B-1, and the *Honolulu Advertiser* (29 May 1974): A-3.

[2] *Honolulu Star Bulletin* (17 November 1976): E9.

[3] Additional information on Bath may be found in Walter Ison, *The Georgian Buildings of Bath: From 1700 to 1830* (London: Faber & Faber, 1948).

[4] Additional information on Miami may be found in Laura Cerwinski, *Tropical Deco: The Architecture and Design of Miami Beach* (New York: Rizzoli, 1981).

[5] *Honolulu Advertiser* (6 March 1938, Magazine Section): 1.

[6] Ibid. (12 December 1929): 11.

[7] "The Million Dollar Image," *Paradise of the Pacific* (March 1962): 6-7.

[8] *Honolulu Advertiser* (21 September 1961): A-1.

[9] Richard Longstreth, "Taste Versus History," *Historic Preservation Forum* 8 (no. 3, May/June 1994): 40-45.

[10] *Honolulu Advertiser* (6 September 1925): 12.

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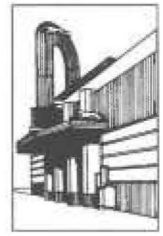

The Sense and Dollars of Preservation

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Abstract
This paper attempts to make two different arguments for the preservation of our recent past. First, the picture of our society drawn by its material realities, especially those in the least self-conscious of contexts - that of discard - often looks very different from the picture of our society that we ourselves have self-consciously recorded. A community is preserved in its full context only when both the self-recorded picture and the material realities picture are placed side-by-side.

Second, the preservation of our recent past both makes practical sense for our society's future and saves real dollars in the realm of solid waste management. The first of two sections explains a common sense rationale for not transforming landfills into bioreactors, but instead "letting landfills be landfills" to keep their buried resources available for mining in the future. The second section describes the solid waste disposal costs which are saved from expenditure by sending to landfills the construction/demolition debris (or "C/D") from the preservation of extant cultural facilities *in place of* the double dose of C/D generated by the demolition of existing facilities and the construction of new ones at the same site.

• • •

I am an archaeologist; but I do not dig up ancient cities lost in Middle American rainforests. Instead, I dig up the garbage our own society has recently spent considerable money to bury in modern landfills. When I founded the Garbage Project twenty-two years ago at the University of Arizona, the rationale was straightforward: If archaeologists can learn important information about ancient civilizations by studying *ancient* garbage, then archaeologists should be able to learn valuable information about our society by studying *fresh* garbage.

In past decades archaeologists have enjoyed this rationale as a game; I decided to take it seriously and discovered that it contains a basic truth: a people's self-reports of their own society, contained in their letters, news reports, books, documents, films (if they had them), and so on, provide one perspective on past lives and lifestyles. A different perspective on the same lives and lifestyles is available through an examination of what people have owned and thrown away. A community's discards - especially the vast array of trash and trifles in garbage middens - stand as informative and truthful reporters to reconstruct that community in ways that self-conscious self-reports never could. Using quantitative measures of garbage, the Garbage Project has documented the extent of the gap between what we say we do and what we actually do in modern America. The material remains of food - in packaging and preparation debris - demonstrate that we eat and drink far more foods that are bad for us and substantially fewer foods that are good for us than we claim in interview-surveys; the recyclables left in our garbage betray publicly proclaimed intentions gone astray; the unused paints and pesticides and the used motor oil and batteries that we put out for garbage collection illustrate how much more dedicated we need to be to the environmental concerns we assert to hold so dear; and the mounds of half-eaten or spoiled bananas, heads of lettuce, and spaghetti with meat balls boast of our continued level of

affluence, even as we complain of economic down-turns and recession. As archaeological pioneer Emil Haury often liked to say, "If you really want to know what is going on in a community, look at its garbage piles!" Only when a community's written words and its material remains, however humble, are both available for study can that community be fully reconstructed in context.

In this spirit, my Garbage Project team of archaeologists has spent the last two decades systematically exhuming and examining recent refuse to define the material realities of late twentieth-century American lifestyles. In that same process, we have also attempted to identify practical approaches to mitigating our present-day garbage dilemmas. In this paper I will argue that the preservation of our recent past both makes practical sense for our society's future and saves real dollars in the realm of solid waste management.

The Practical Sense of Preservation

As an archaeologist, I believe that historic preservation immeasurably enriches humanity. As a garbage archaeologist, or "garbologist," the prime article of my faith is that the preservation of the recent past enriches us just as immeasurably; but this is a topic for other speakers. I will concentrate on describing more immediately practical aspects of preserving the recent past - specifically, conserving resources and money.

We will always be curious about the nature of our past and the lessons it can teach. One of the most interesting of these lessons, of course, is how a people's perception of their community and their lifestyles differs from the material artifacts and artifices among which they live. As a result, someone will always be trying to reconstruct the material realities of bygone days. Those facilities that are preserved will save archaeologists, historians, educators, and even entertainment industry art directors innumerable costly episodes of digging in the ground and of combing the available literature; some facilities might even recoup a portion of their preservation costs through film roles.

My second point about preserving the recent past focuses on biodegradation. Most people believe that inside landfills our organic discards biodegrade into compost. Surprisingly, when the Garbage Project conducted the first systematic excavations of landfills to determine their contents, we discovered that in well-run, dry landfills biodegradation is slow to seemingly non-existent. While one-half of yard and food wastes biodegrade during the first fifteen to twenty years of burial, the other half seems to stabilize in the form of hot-dogs or leaves, guacamole or grass clippings, which are still recognizable after two or three decades in a landfill. As for paper, biodegradation is even less evident. From the depths of fifteen landfills across North America, the Garbage Project has retrieved 2,425 datable, readable newspapers which accounted for about ten percent of the weight and volume of all excavated refuse. These and all other landfills represent time-capsules of irreplaceable material realities from our past that are still in the use and frequency context of everyday living and discard.

Many people do not realize that from the very first, landfills were never meant to biodegrade anything; in fact, just the opposite, they were designed to fill in "useless land" and then be stable enough to have houses, schools, shopping malls, and the like, built upon them. Ironically, in the 1940s and 1950s, when landfills were coming into their heyday, they were sited in all the wrong places for this purpose. At the time, swamps and marshes were defined as useless land; but because of ample water, naturally occurring methanogens, and no liners to separate these constituents from refuse, the earliest landfills also promoted biodegradation that led to leakage in the form of "leachate," which in turn led to the reputation for doing evil which landfills still enjoy.

Today, safe landfills that vent methane gas and collect and purify leachate are being built with multiple-layer liners and caps in sites that promote rainfall runoff and do not overlie aquifers. So far so good.

Also today, however, there are experiments that pump leachate back into landfills in the hope of promoting biodegradation. I am all in favor of experimentation; but before we create landfill "bioreactors" from coast to coast, I suggest that we await the test results. The questions that remain to be answered about bioreactors are significant: (1) How much will they cost to operate versus the potential return from methane utilization and sales? (2) How long will they have to be carefully monitored for the sake of public safety? and (3) Landfills currently fulfill useful afterlives as golf courses, parks, outdoor concert arenas, and even "nature preserves." What kind of afterlives await bioreactors? Once the data are in, public policy planners will be better able to evaluate the various benefits of

landfills that "mummify" against those that biodegrade our material heritage.

In this debate over the practical consequences of landfill design, I believe that there is an argument to be made that at least some of the remains of our immediate past be protected into the future within safe and traditional dry landfills. Given that our society has reported on itself more fully than any other - some might even say to the point of obsession - why would anyone still need to examine our material remains? The answer has been documented by twenty-two years of garbage studies: The picture of our society drawn by its material realities, especially those in the least self-conscious context - that of discard - often looks very different from the picture of our society that we ourselves have self-consciously recorded. A community is preserved in its full context only when both the self-recorded picture and the material realities picture are placed side-to-side. Thus, for the sake of a full and honest historical perspective on twentieth-century America, I simply suggest that we "let landfills be landfills."

I am pleased to report that beyond my desire to bequeath future archaeologists job security, there is a common sense argument for the preservation of landfilled materials. The resources our society has so self-indulgently manufactured into single-use throwaways are not forever lost; they may be recovered at some future time through landfill mining. That future, in fact, does not reside in science fiction. Landfills are being mined as I speak.

Robert Fahey, Solid Waste Director of Collier County, Florida, was the first landfill miner of whom I am aware. With enviable entrepreneurial skill he assembled an odd-looking contraption which would have made Rube Goldberg proud (What a candidate for preservation in the near future!). In operation, front-end leaders dump excavated refuse onto a grizzly coarse-bar screen, with a 3.5-inch mesh vibrating screen underneath, and a series of accreted components to separate various constituents such as cover soil, steel, aluminum, and glass. Fahey's concept is now being seriously considered or actually tested in a dozen locales nationwide. Most prominent among the emulators are a series of rural communities in New York State.

As of the current date, the main item which is being economically recovered by landfill miners is cover soil. For Fahey, it is valuable because his landfill is in the middle of the Everglades. Cover soil costs a small fortune to import each year, and reusing it saves Collier County a bundle. Aluminum has been easy to sell, but it represents a very tiny quantity. Other products have been a challenge to market, both because they are contaminated with soil and diverse residues and because commodity demands are being met today by growing numbers of community curbside programs that collect fresh and relatively clean recyclables. Nevertheless, I believe that present-day attempts at mining will make an important contribution to the efficient use of resources in the future.

We commonly say that "necessity is the mother of invention"; but no one has documented this as a fact. Instead, it seems more likely to me that necessity is the mother of the *application* of successful experiments undertaken back when times were good. When more difficult times come to America and energy-intensive resources are difficult to obtain (and, take it from an archaeologist, these times will come sooner or later), the literally ground-breaking efforts of Fahey and his compatriots will be greatly appreciated - as will the availability of the resources *banked* in landfills.

While the practicality of this argument for "mummifying" landfills has yet to be fully demonstrated, the practical value of preserving structures built in the recent past is a fact of life embedded in today's monumental garbage woes.

The Real Dollar Savings of Preservation

I believe that our society's most pressing solid waste goal should be "source reduction." As a nation we have embraced recycling; but recycling is like taking an aspirin in the morning to cure a hangover. Source reduction - or just "using less stuff" - is like drinking responsibly the night before. Clearly, the best way to keep stuff out of America's waste stream is not to produce or use it in the first place.

The main reason that I am talking to you is that by some gift of the gods, you hold one of the keys critical to a comprehensive source reduction solid waste solution. You are no doubt familiar with waste management's "Three Rs" - Reduce, Reuse and Recycle. I believe that the three Rs will soon become four: Reduce, Reuse, Recycle and Restore (or, in other words, "pre-

serve"). This belief comes from my experience with landfills.

I am often asked "What's the biggest surprise you've found in your landfill digs?" Some questioners assume the answer will be "styrofoam," because its volume is so small compared to most people's perceptions, less than one percent compared to an expectation of twenty to forty percent. Others are sure I will say "paper," because it occupies more than forty percent of the volume of most landfills. They are both wrong. The biggest surprise was a landfill content that eluded Garbage Project researchers even after dig results began to accumulate - construction/demolition debris, or C/D.

At first, the Garbage Project had avoided or ignored C/D. There were several reasons for this aversion: (1) C/D is extraordinarily dull and uninteresting (big pieces of lumber, concrete, wallboard and the like), (2) C/D is bulky, heavy, and unmanageable (just one ruptured block of concrete can be the size of a standard sample of landfill refuse), and (3) C/D can disable the toughest and most costly landfill excavation equipment. As a result of our disaffection toward C/D, we recorded very little of it in the first six landfills we dug. (Never mind that we had to drive around huge mounds of it on the surface, and that every so often we would be forced to abandon an excavation when our bucket auger hit an impenetrable layer of concrete.)

We are not the only ones whom C/D debris has eluded. The EPA has labeled C/D as an independent category of waste, distinct from ordinary MSW. The result is that because C/D is not officially MSW, by EPA definition C/D supposedly takes up no room whatsoever in municipal landfills.

In reality, of course (if unofficially), landfills are chocked-full of C/D. When the Garbage Project purged itself of its bias and took refuse samples every few feet no matter what, our picture of the insides of landfills altered dramatically. Excavations at our last three U.S. landfills documented that C/D alone was equal to nearly one-third of the weight *and* the volume of general mixed refuse. Rather incredibly, our subsequent digs at four Toronto-area landfills produced identical results.

There is nothing new about construction/demolition debris - whole civilizations have been built on it. Among the earliest civilizations in the Near East, for example, when a house was to be rebuilt, the old roof and walls were knocked in to use as a foundation for the new structure. In this manner, ancient cities rose atop their C/D wastes. Much of London is fully twenty feet higher than its Roman ancestor.

Urban centers are still rising on their wastes. Construction/demolition fill underlies LaGuardia airport, much of Foster City, California, and Toronto's tony harborfront district. No one knows for sure how much C/D debris has been incorporated into New York City's substrata, but "street level" on the island of Manhattan today is typically six to fifteen feet higher than it was when Peter Minuit lived there in the seventeenth century. As just one recent example, construction workers unearthed a ship that *had* been loaded with garbage and positioned as fill on a Manhattan beach in the late 1700s. At the time of the excavation, the ship lay twelve feet below 175 Water Street in the Wall Street district!

To me there is no question that C/D is currently one of the most significant contributors to our fast-filling landfills and our other garbage woes, and that preservation is one of the most effective source reduction solutions.

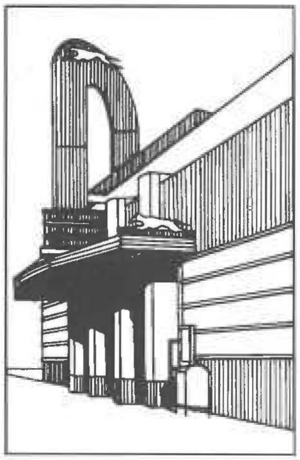
For decades there have been calls by the media to decrease "built-in obsolescence" and increase durability in major appliances. If one new appliance is not bought, then one old one is not thrown away, or so the reasoning goes. Ironically, most discarded appliances are either shipped overseas as scrap metal, sold to low-income households or scavenged for parts to repair those older models in low-income households.

While this particular source reduction theory doesn't fit appliances that well, it is certainly applicable to our built environment. I am aware that a full scale restoration of a dilapidated structure can generate several fifty-yard roll-offs of C/D. No matter what measures are used, however, less demolition debris will be carted away for disposal if the structure in question is not totally torn down, and less construction debris will be discarded if a new building is not built on the site from scratch. The financial savings in transport and landfilling, incineration, and even recycling, are substantial. Perhaps even more valuable to society is the savings in available landfill space *not* used and in *not*

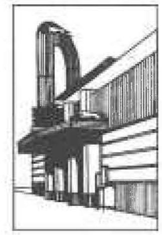
having to create new landfill space to take its place.

As an archaeologist, I believe the past, both ancient and recent, deserves the respect of preservation. At the very least, as a garbologist I believe that preservationists should be recognized for their massive contribution to source reduction. They might even consider lobbying for tax credits based on avoided C/D disposal costs.

I have argued that preserving the material realities of the recent past will allow future generations to reconstruct our communities in the full self-recorded and material realities context of their place in history. Within a more limited, but more practical context - that of the continued availability of landfill capacity and the banking of specific material resources - I fully believe that in your efforts to preserve our past, you have become a component critical to preserving our future.



The Cold War



The Packaging of Armageddon: Symbolic Landscapes and American Civil Defense, 1945-1955

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"Familiarity takes the sting out of practically anything, even Armageddon."

A journalist quoted in Paul Boyer's
By the Bomb's Early Light[1]

In the 1950s, Americans embraced the technology of the Atomic Age, while also learning to live with the constant threat of nuclear annihilation. During this period, familiar images of the American Main Street, family life, and community provided a backdrop to the nation's civil defense programs. This essay considers how valued landscape images and stereotypes were used by the United States government as propaganda to calm the public's anxiety surrounding the rise of nuclear weaponry. The small town, the village, and the safety of family and home became central persuasive images in civil defense discourse; they became the metaphors by which the bomb was "domesticated" in the 1950s.

An important counterpoint to these comforting images were the apocalyptic novels and short stories of the period that employed the same familiar landscape imagery, not to reassure the reader, but to convey a terrifying vision of the effects of nuclear warfare on human life and everyday environments. These stories brought the Bomb to Main Street using the same picturesque imagery of American small towns and suburbs that the government used as a calming influence, to make the threat of Armageddon seem more terrifying and real. Ideal landscape types have the capacity to create reassuring and familiar contexts for the unknown. But, with regard to the Cold War, their subliminal power can also be inverted to show in very convincing terms the lethal potential of nuclear weapons.

The geographer Donald Meinig has argued that "every mature nation has its symbolic landscapes. They are part of the iconography of nationhood, part of the shared set of ideas and memories and feelings which bind a people together."[2] For Meinig, the three quintessential American symbolic landscapes are the New England village, the Midwestern Main Street, and the California bungalow suburb. Representations of such places in illustrations and advertising can be "powerfully evocative because they are understood as being a particular kind of place rather than a precise building or locality."[3] Whether in the background of magazine covers, wallpaper designs, or advertisements for new cars, these symbolic landscape types have the power to suggest an impression of continuity and a connection with national aspirations and concerns. Symbolic association with valued landscapes or family settings can make something foreign or novel seem more familiar - whether it is a new car or an unprecedented technology. Landscapes, whether vernacular or professionally designed, are not politically neutral containers for human endeavors.

Rather, as advertising art directors have always known, the setting can help to sell the product.

"Atomic energy," as it was called in the aftermath of the Second World War, was indeed strange, frightening, and new. It had the force to bring about human annihilation, while also seeming to promise a futuristic environment in which the weather could be controlled and homes, ships, and even cars could be powered by their own tiny atomic energy plants. In the period immediately following the end of the war, Americans were highly suspicious of atomic weaponry in a manner that foreshadowed many of today's concerns. But peaceful applications and civil defense became the means by which government and industrial advocates of nuclear technology sought to convince the public that the "Atomic Age" was not only inevitable, but highly alluring.[4]

Feeling Better About the Bomb

In the early 1950s, the United States government promoted civil defense as a means of emotional relief and self-protection in response to lingering anxiety over the Bomb. *How to Survive an Atom Bomb,* a government-sponsored paperback published by Bantam in 1950, boasted on its cover that "If there's ATOMIC WARFARE this book may save *your* life!" Written in a question and answer format, the book stated that the "Truth is bad enough - but nowhere near as bad as you probably think" and that panic caused by "misinformation" might be one of the best weapons that an "enemy could use against us." The back cover, extolling the feelings of relief that would arise from facing and knowing the "facts," proclaimed that, "this book will tell you how to protect yourself and your family in case of atomic attack. There is no 'scare talk' in this book. Reading it will actually make you feel better."[5]

Despite the possible atomic utopia that lay in the near future, "feeling better" about the darker side of nuclear technology was a concern still very much present in the American psyche. At the beginning of the Atomic Age, the effects of an atomic blast were often likened to such natural disasters as earthquakes and volcanic eruptions. The search for such sublime analogies reflected the need to bring some historic precedent to a technology that still posed more questions than answers as to its destructive power.

The Defense Department realized that if the power that had unleashed a new age was to be demystified and accepted as inevitable, it would have to be described in the clearest and most familiar language possible. To mitigate the terror of nuclear war, a new mythology of the "survivable" home and community arose, expressed in terms of symbolic landscapes that Americans could actually recognize. By 1949, "facing the fact of atomic energy" became the theme of government-sponsored conferences and resource units for school teachers. With the creation of the Nevada Test Site by President Truman in 1950, the reality of the Bomb was brought closer to home.[6]

This "Survival Town" house, some 7,500 feet from a 29-kiloton nuclear detonation, remained essentially intact. Survival Town consisted of houses, office buildings, fallout shelters, power systems, communications equipment, a radio broadcasting station and trailer homes. The town was built for a civil defense exercise and to test items not previously subjected to a nuclear blast. The test, called Apple II, was fired on May 5, 1955.

Initially, the business community of Las Vegas feared that the closely-located nuclear test site might affect tourism. The Las Vegas Chamber of Commerce quickly launched a pro-atomic public relations campaign that placed the Bomb within the familiar context of popular culture. A 1952 *New Yorker* article about life in Las Vegas, described three Chamber publicity releases: one showed a model with an "Atomic Hairdo," a second gave the recipe for the Atomic Cocktail (equal parts vodka, brandy, and champagne, with a dash of sherry), and the third showed

Most subsidences leave saucer-shaped craters varying in diameter and depth, depending upon the yield, depth of burial, and geology. This is the north end of Yucca Flat. Most tests are now conducted in this valley.

another model in a bikini checking a grizzled desert prospector for radiation. "'The angle was to get the people to think the explosions wouldn't be anything more than a gag,' a Chamber of Commerce official explained...."[7] With these stunts, the private sector provided an important precedent in attempting to shape media coverage of the testing.

The new medium of television proved particularly effective for disseminating civil defense strategies. The Atomic Energy Commission (AEC) and the recently created Federal Civilian Defense Agency (FCDA) began to coordinate media coverage at the Nevada site so that the testing and civil defense research would be portrayed as a necessary component of national defense. "Operation Doorstep," an early civil defense detonation that destroyed two completely furnished Colonial Revival style houses on March 17, 1953, was televised live to the nation. Following the test, an FCDA-sponsored and publicized survey found that seventy per cent of the public had become aware of the government's testing activity as a result of the coverage.

The Test Town as Home Town

Possibly encouraged by the public relations success of Operation Doorstep, the AEC and the FCDA organized a much grander test town named "Survival City" for simulated atomic attack during the Operation Cue test series of 1955. This "doom town" contained many elements designed to represent a "typical" American community: ten homes built of brick, cement block, and wood frame; metal industrial buildings; a radio station; utility systems; and a power plant. Gladwin Hill wrote for the *New York Times* that the theme running through all the press briefings was:

> that the Russians confronted the United States with a perpetual threat of nuclear attack; that the atomic tests were the keystone of defensive activities on the part of this country; that civilian defense indoctrination and training was another vital aspect, and that the tests were planned and conducted so as to involve virtually no radiation hazard to anyone in the country.[8]

In addition to a desire to convince the American public that a nuclear war could be survived and that nuclear weaponry was a new fact of life, a central belief on the part of civil defense planners was that America had won both of the preceding world wars through a high level of domestic production that eventually overwhelmed the enemy. According to this theory, civil defense would become the "keystone of defensive activities" in the nuclear age because it could prevent the country from being rendered helpless in the case of a surprise attack. Val Peterson, a former Nebraska governor, became the director of the FCDA in 1953. With a politician's sense for symbolism, he evoked traditional images of the American family and home in justifying civil defense research during

Television coverage of "Operation Doorstep" led to greater pubic awareness of the tests. (Photo courtesy of Las Vegas News Bureau)

"Operation Doorstep," the early televised civil defense detonation, destroyed two furnished Colonial Revival houses. (Photo courtesy of the Nevada Historical Society)

the Survival City press briefings. In his opening address to reporters and guests, Peterson noted that civilians were now included as observers in tests that would have previously been limited to the military:

> It is significant because it shows, dramatically I think, the full cycle we have run to bring warfare back to our homes and doorsteps.
>
> It was there, you'll remember, a few generations ago. In the early days of this country our women and children knew what fighting meant. They saw it, took part in it. They loaded the muskets, helped put out the fires. That was our earliest civil defense.[9]

These images of family, self-reliance, and locally-based initiatives hearkened back to the heroic stories that many schoolchildren had learned about the American Revolution and other early wars. In recalling such valued national stories, Peterson sought to bring familiarity and the lore of American readiness to civil defense, a precedent that often seemed at odds with the unparalleled deadliness of nuclear weapons. Once again, the American family would become the first line of defense.

In print media descriptions, Survival City, with its stylishly dressed mannequins, Colonial Revival houses, cars, and suburban streets, took on many of the qualities of the "typical" American community. Carefully briefed and enthusiastic reporters lent the test town characteristics that their readers, listeners, and viewers could recognize. Newspaper correspondents began

their reports with the dateline, SURVIVAL CITY; they gave the streets cleverly morbid names such as "Doomsday Drive"; and some writers went so far as to describe features such as a Main Street that was not actually included in the configuration of buildings. In a "humorous" story about the town on the *Today Show,* a host interviewed some of the mannequins for their opinions about Survival City and civil defense.

The prevailing hope on the part of the test's planners was that with the right kind of houses, clothes, domestic products, and utility systems, Americans could survive and win a nuclear war. Packaged as a "scientific experiment" for a cooperative press corps, the nuclear attack on Survival City was actually a media spectacle that relied on familiar images of home, family, and community in an attempt to convince the American people that, with the right preparation, they too could survive. "The homes are much like your home," the United Press reported. "Substituting for people are mannikins *[sic]* dressed like you and your family."[10] For the brief period of its media-based existence, Survival City existed as a pure simulation, as a town without actual memories or inhabitants that was designed to symbolize the home towns of people throughout the country. Survival City can be understood as an early TV stage set: an essentially uninhabitable and made-for-television community whose meaning could only be projected through print and electronic media.

On May 5, 1955, after several delays caused by weather, the homes, mannequins, and cars of Survival City were exposed to an atomic blast with twice the force of that which destroyed Hiroshima. CBS and NBC pooled resources to carry the test live on national television. Several hundred people witnessed the explosion, including government officials, civil defense workers, soldiers, reporters, and representatives from the companies whose products - houses, trailers, clothing, furnishings - were to be tested for their resistance to the blast.

Grandma Knows Best

One month after the destruction of Survival City, a civil defense "checklist" appeared in *Women's Home Companion.* Wedged between advertisements for face cream and rubber gloves in "3 Glamorous Colors" was the headline: "Take These Steps Now TO SAVE YOUR FAMILY." A message from FCDA director Val Peterson warned that "every homemaker in America must be aware of the problem and put into action protective measures that will insure the survival of her family." The FCDA's "Grandma's Pantry" program was intended to relay the same message in a more reassuring manner. Instead of openly stating the nuclear threat to the nation, the program relied on the familiar images of women in another time creating a food reserve to prepare their families for emergencies:

> Remember Grandma's Pantry, its shelves loaded with food, ready for any emergency, whether it be unexpected company or roads blocked for days by a winter storm? Today, when we are vulnerable as always to the ravages of nature as well as the possibility of nuclear attack, every wise and thinking family will likewise prepare for emergencies with the modern equivalent of Grandma's Pantry.[11]

The Today Show host interviewed mannequins about Survival City. (Photo courtesy of the Nevada Historical Society)

Top and Bottom:
The mannequin occupants of Survival City seen before and after the May 1955 atomic blast. (Photos courtesy of the Nevada Historical Society)

The modern equivalent of Grandma's food reserve would, of course, be located in a bomb shelter. One juxtaposition of Grandma's Pantry with the reality of nuclear attack occurred at the 1955 Nebraska State Fair. One of the structures tested at Survival City, a corrugated metal building manufactured by the Behlen Company of Columbus, Nebraska, was placed on exhibit. Thousands toured the slightly dented "atomic building" with jagged glass around the window frames. Inside, civil defense workers staffed a Grandma's Pantry exhibit.

The Grandma's Pantry brochures distributed at the Nebraska State Fair and hundreds of other fairs and conventions, did not directly associate such a pantry with the basement bomb shelter. Instead, images of snow-covered roads and Grandma's winter preparedness hearkened back to an earlier, less dangerous time. The ideological implication of such civil defense publicity campaigns was that nuclear war had become an ordinary fact of life; it could be discussed and prepared for in the same way that one might prepare for unexpected guests.

Fiction and the End of Home

While civil defense programs and publicity were often couched in the reassuring contexts of familiar landscapes and the American family,

The Behlen Company corrugated metal building that survived the 1955 test blasts at Survival City was available for viewing at the Nebraska State Fair of that year.

some of the apocalyptic novels of the era employed the same imagery to terrify the reader. Neville Shute's *On the Beach* (1957), and Helen Clarkson's *The Last Day* (1959) both describe characters who face the end of life on earth after a nuclear war. The novels are filled with idealized, symbolic landscapes: small town Main Streets, New England villages, and suburban homes. These places did not have bomb shelters and organized civil defense; and in very believable scenarios, the characters wait for inevitable death. In Clarkson's novel, the villagers ultimately use lethal doses of sleeping pills; in *On the Beach*, the government provides free cyanide capsules.

On the Beach is set in Australia after a nuclear war has completely destroyed life in the northern hemisphere. The novel explores how a group of characters, including a married couple and an American navy captain, immerse themselves in home settings and daily routines while awaiting the inevitable end. The survivors try to continue their daily lives with an obsessive cultivation of gardens, work, and hobbies even as the familiar world around them is dying. In the end, by taking government-issued cyanide pills, most of the characters die in their home settings.

A far more critical but relatively unknown counterpart was Helen Clarkson's novel, *The Last Day*. Written from the first-person perspective of a woman, the novel is set in a New England island village after a nuclear war. The characters, like their counterparts in *On the Beach*, wait to die from radiation; they do not however, passively accept death or obsessively continue daily routines. Soon after the atomic flash, the community holds a town meeting then pools its resources in efforts that ultimately reveal the futility of civil defense.

As the world ends, the characters express both rage and sorrow. The scientist explains why he quit his atomic weapons job with the government: "I knew I carried death in my pocket. So I was guilty as long as I went on doing what I was doing." The doctor bitterly describes the 1950s arms race and the government's claim that the build-up was necessary for defense. "Whose defense," he asks, "if we are all dead or dying now?"[12]

Conclusion

With the much touted "end" of the Cold War, the Bomb and nuclear warfare have lost some of the terror and symbolic force that they once held in the minds of Americans. Nonetheless, the power of valued landscapes and national settings to domesticate the unthinkable remains a potentiality that students of the landscape should recognize. The nuclear family, the freestanding house, and Main Street are precisely the images that could bring the destructive implications of nuclear warfare "home" to millions of Americans. But like many valued settings, they have the potential to evoke both comfort and fear, survival and death. With the awesome force of nuclear weapons, familiar landscapes were once employed to calm the fears of Americans. Such scenes also hold the critical power to convey the haunting sense that a cataclysmic event can happen all too close to home.

Notes

[1] Paul Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age* (New York, New York: Pantheon, 1985), 357.

[2] Donald W. Meinig, "Symbolic Landscapes: Models of American Community," *The Interpretations of Ordinary Landscapes*, D. Meinig, editor (New York, New York: Oxford University Press, 1979), 164.

[3] Ibid., 165.

[4] By focusing on the period 1945-1950, Boyer argues that the government stressed "peaceful" applications of nuclear technology to allay the public's anxiety over the prospect of nuclear war.

[5] Richard Gerstell, *How to Survive an Atom Bomb* (New York, New York: Bantam Books, 1950).

[6] The 1,350 square mile site is a crater-studded landscape located seventy-five miles northwest of Las Vegas, now being surveyed for its historic importance. Allen Freeman, "Echoes of the Cold War," *Historic Preservation* (January/February, 1994): 28.

[7] Daniel Lang, "Blackjack and Flashes," *The New Yorker* (20 September 1952).

[8] Gladwin Hill, *The New York Times* (24 April 1955), 1.

[9] Federal Civil Defense Administration, *Annual Report, 1955* (Washington, DC: US Government Printing Office, 1956).

[10] *Lincoln (Nebraska) Star*, 25 April 1955.

[11] Federal Civil Defense Administration, *Between You and Disaster: For Your Survival - A Civil Defense Home Food Storage Program*, brochure (Washington, DC: US Government Printing Office, 1955).

[12] Helen Clarkson, *The Last Day: A Novel of the Day After Tomorrow* (New York, New York: Dodd, Mead & Co., 1959), 165.

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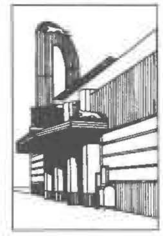

Preserving a Cold War Icon: The Minuteman II Missile System

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United States Air Force
Washington, DC

As a vital aspect of the Cold War, the Minuteman II Inter-Continental Ballistic Missile System (MMII ICBM) that was developed in the country's midwestern states was by all accounts an overwhelming technological and logistical achievement. Constructed between 1961 and 1963, the system consisted of 1,000 launch facilities (LF or silos) controlled by numerous launch control centers (LCC). These were connected by tens of thousands of miles of underground, blast-proof cable spread out in a half dozen states over a 15,000 square mile area. These facilities were constructed, maintained, and kept on launch alert 24 hours a day by hundreds of personnel sealed for extended periods underground, with little indication on the surface to acknowledge their presence. This system proved to be operational in several early launching tests and remained unaltered until deactivation in September of 1991, as a result of the impending ratification of the Strategic Arms Reduction Treaty (START). Shortly thereafter, the Air Force began implementation of a schedule to destroy or retrofit existing MMII ICBM facilities by the spring of 1993. The Department of Defense Legacy Resource Management Program (Legacy) funded a project beginning in 1992 to create an historic context study for the MMII ICBMs and to establish a methodology to record and possibly preserve one of these well-known Cold War icons before they are systematically destroyed.

The first Minuteman missile was placed on alert at Malstrom Air Force Base in Montana on October 27, 1962, in the midst of the Cuban missile crises. It was referred to as the "ace in the hole" by President John F. Kennedy in dealing with the Soviets, and served as a catalyst for a peaceful resolution to the conflict. The MM I missile was a relatively simple, lightweight, and reliable weapon that was inexpensive to build and maintain, and quick to launch; a vast difference from its predecessors known as Atlas and Titan I missiles.[1] The MM I missile could deliver a warhead to any continent within one-half hour of launch from American soil, replacing the need for many manned bombers.

The facilities associated with the MM system consist of a Launch Facility and a Launch Control Center. Each Launch Facility housed one Minuteman missile suspended in a reinforced concrete silo, eighty feet deep and covered by a rolling, eighty-ton concrete door on the ground surface. An antenna and surveillance camera are the only apparatus visible above ground. Each missile is sixty feet in length, six feet in diameter, and weighs 68,000 pounds. When armed, the weapon was solid-fueled with three rocket motors and one nuclear warhead. They were designed to fly out of Earth's atmosphere, travel over the Arctic Circle, and re-enter the atmosphere to strike their targets. A specialized missile transport truck was adapted at the site to install and remove missiles when necessary. The Launch Control Center is a separate structure from the Launch Facility and houses a command center, located thirty to sixty feet underground, that can activate up to ten missiles housed in different Launch Facilities several miles away. This area is accessible by hydraulic elevator from the surface, and is protected by an eight-ton blast door[2] that remained sealed for twenty-four hour periods from the support crew located above ground. It is constructed of steel-reinforced

concrete in a capsule shape, suspended from a blast proof outer structure by shock isolators.

Two missileers served on alert in this capsule at all times during its operational years, ready to receive launch codes for an actual launch. At times, false or practice alerts were sent out from the installation to test the readiness and acceptability of the crew to perform its function; the crew inside the center could not differentiate between practice or actual launch codes until the completion of the exercise. At higher states of readiness, the crew strapped themselves into their seats to await launch commands authorized by the President of the United States. The missileers would copy their launch commands to ensure they had each received the same message, and would have to turn keys simultaneously in physically separated launch ignitions to initiate the launch sequence. An extensive above-ground facility stands on top of the capsule to serve rotating missileers and the needs of those on alert by providing security, air and power, cooking facilities, housing, communications and access. The 1,000 MMII facilities were scattered across the Midwestern states over a 15,000 mile square area, hundreds of miles from their associated military installations. Crews and supplies were rotated in and out of the remote sites by helicopter.

The second installation to receive MM I missiles on alert was Ellsworth Air Force Base, South Dakota, in July of 1963.[3] Tests of the new system were performed at Ellsworth in March of 1965 with short burn MM I missiles, launched from operational silos in a seven-second flight known as "Project Long Life." Considering these tests, technological changes in the internal systems of MM I missiles introduced a new series of weapons termed MM II in March of 1973.[4] These upgrades were made to the existing MM I Launch Facilities and Launch Control Centers. While the entire MMII system was deactivated

While on duty inside the Minuteman II Launch Control Center (Delta I), missileers would often receive practice alerts requiring them to run through the launch procedure, without being able to differentiate the practice or actual launch codes until the exercise was completed. (Photo from the Ellsworth Air Force Base, Jackson County, South Dakota National Historic Landmark nomination to the National Register of Historic Places, HQ USAF/ CEVP files.)

This eight-ton blast door protected missileers in the Minuteman II Launch Control Center known as Delta-1 from an incoming nuclear explosion. The doors were commonly painted with different murals in a contemporary version of the well-known World War II aircraft paintings. (Photo from the Ellsworth Air Force Base, Jackson County, South Dakota National Historic Landmark nomination to the National Register of Historic Places, HQ USAF/ CEVP files.)

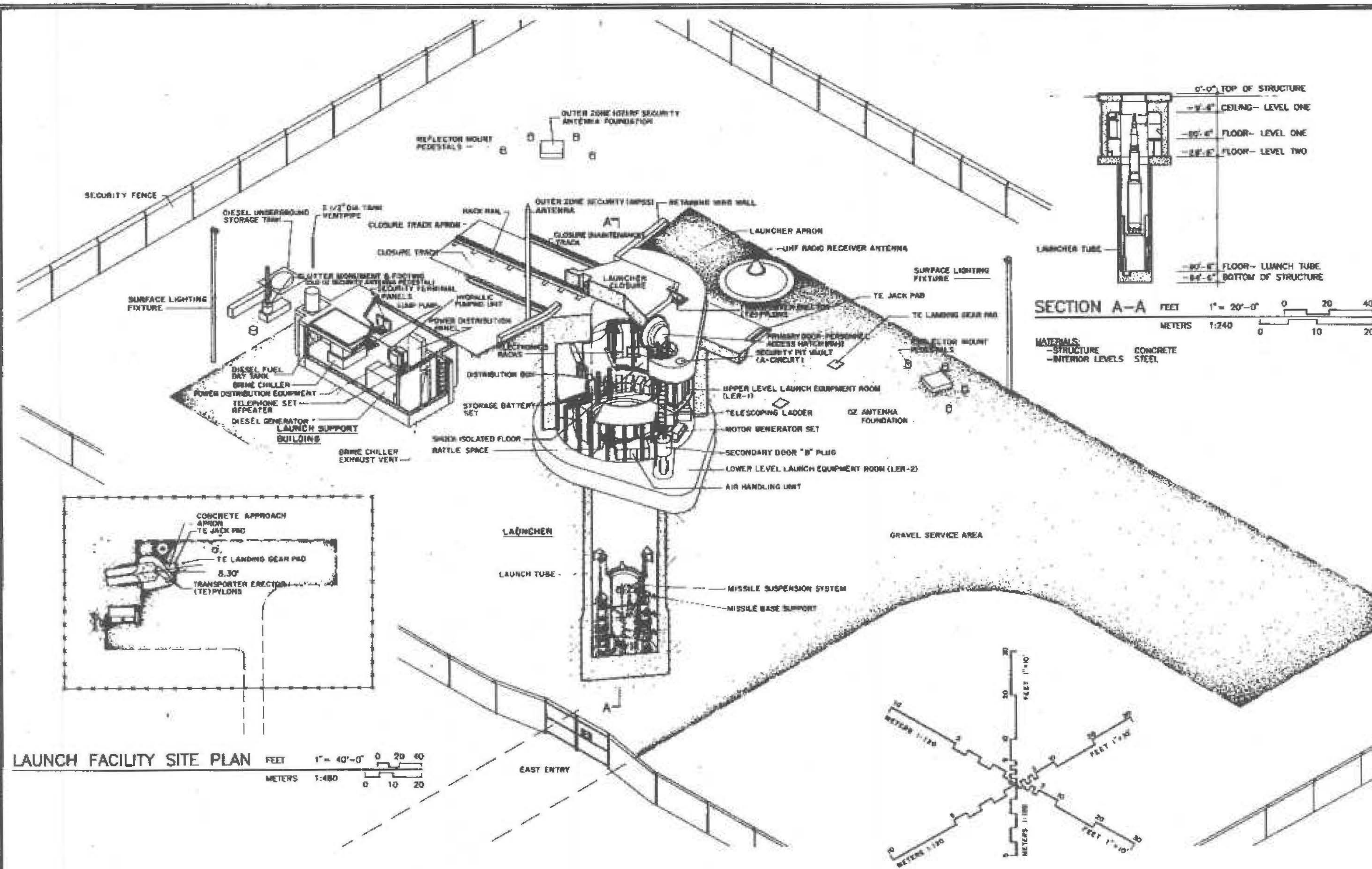
(nuclear warheads removed) and scheduled for demolition beginning in 1991, the earliest facilities at Malstrom Air Force Base were significantly retrofitted to accommodate a new series known as MMIIIs, and the site remains an active missile base today. Due to these changes, the earliest facilities at Ellsworth were therefore chosen as the site for the Legacy context and preservation feasibility studies.

The Legacy Program was created and funded beginning in 1991 to "promote, manage, research, conserve, and restore the priceless biological, geophysical, and historical resources which exist on public lands, facilities, or property held by the Department of Defense."[5] Among the nine legislative purposes addressing natural and cultural resources is the mandate to "coordinate with other federal departments, agencies, and entities" to establish "projects to inventory, protect, and conserve the physical and literary property and relics of the Department of Defense, in the United States and overseas, connected with the origins and the development of the Cold War."[6] The Department of Defense is the steward of approximately 25 million acres of land in the U.S., most of which has seen Legacy demonstration projects in one form or another to address resource management needs or to contribute to a pool of data, knowledge, and expertise that will form the basis of the program and support parallel efforts elsewhere throughout governmental and private sectors. Congress has supplied the Department of Defense in excess of $135 million since the inception in 1991 that has funded close to 600 projects to date.[7]

An antenna and various surveillance equipment at Delta-9 Launch Facility was the only apparatus visible atop the 80-ton concrete door that concealed the 60 foot, 68,000 pound Minuteman II Missile housed in the below ground silo. (Photo from the Ellsworth Air Force Base, Jackson County, South Dakota National Historic Landmark nomination to the National Register of Historic Places, HQ USAF/CEVP files.)

The first Legacy project to address the deactivation and eventual demolition of the MMII system was initiated in 1992 by the Army, in partnership with the Branch of History of the Rocky Mountain Regional Office, National Park Service.[8] The pilot project established the methodology to document and preserve MMII and Nike launch facilities in the western United States. The project planning document addressed several concerns, including access and use of classified documents, criteria for selecting the most representative launch facilities to document and/or preserve, and because the resource was operational only a few years previously, the use of such non-traditional Historic American Engineering Record (HAER) media as video histories to interpret and document the resources. Historic contexts were researched and written for both MMII and Nike missile facilities throughout the United States, an inventory was taken of existing facilities, and a methodology established for intensive, Level I HAER documentation.

However, since the MMII system was taken off alert and "mothballed" in 1991, all facilities were scheduled to be destroyed by the spring of 1993. The arms race now became a race against time for preservationists concerned about documentation and recordation, at a minimum, of this Cold War resource. In the midst of the Army lead project, the Advisory Council on Historic Preservation notified the Air Force that these resources may be eligible for listing in the National Register of Historic Places. The Federal Preservation Officer for the Air Force was beginning to recognize the uniqueness of the cultural resources associated with the Cold War that eventually lead to interim guidance on the subject.[9] A series of meetings of all those concerned took place at Ellsworth Air Force Base



LAUNCH FACILITY DELTA-09 CUT-AWAY AXONOMETRIC

FEET 1" = 10'-0" 0 5 10 20

METERS 1:120 0 5 10

DELINEATED BY GARY K. STEPHENS

ROCKY MOUNTAIN REGIONAL OFFICE: DENVER

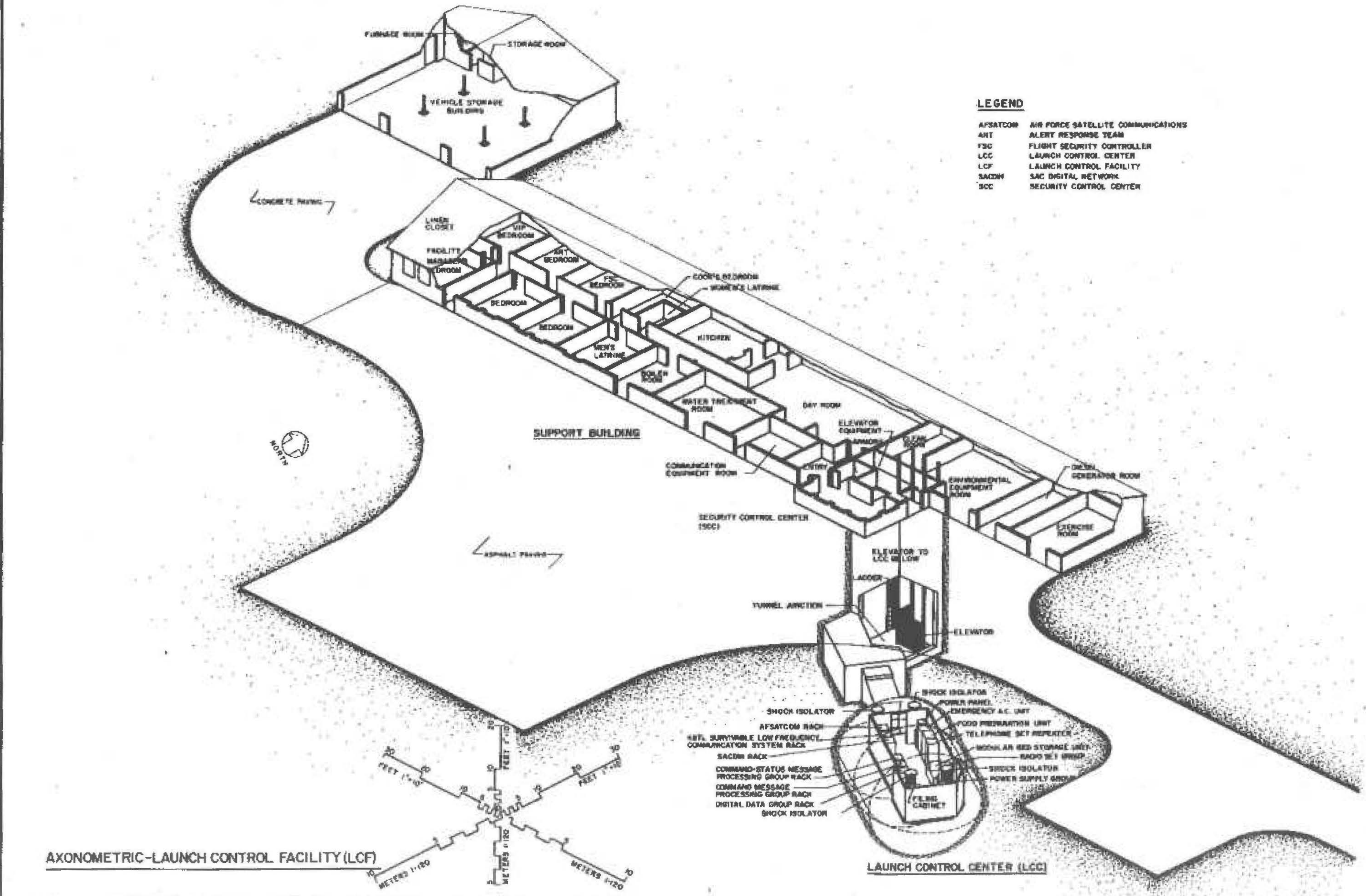
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

ELLSWORTH AIR FORCE BASE: DELTA FLIGHT, LAUNCH FACILITY

RAPID CITY VICINITY — MEADE COUNTY — SOUTH DAKOTA

SHEET 1 OF 1

HISTORIC AMERICAN ENGINEERING RECORD SD-50-C



AXONOMETRIC-LAUNCH CONTROL FACILITY (LCF)

DELINEATED BY: GARY S DUNLAP

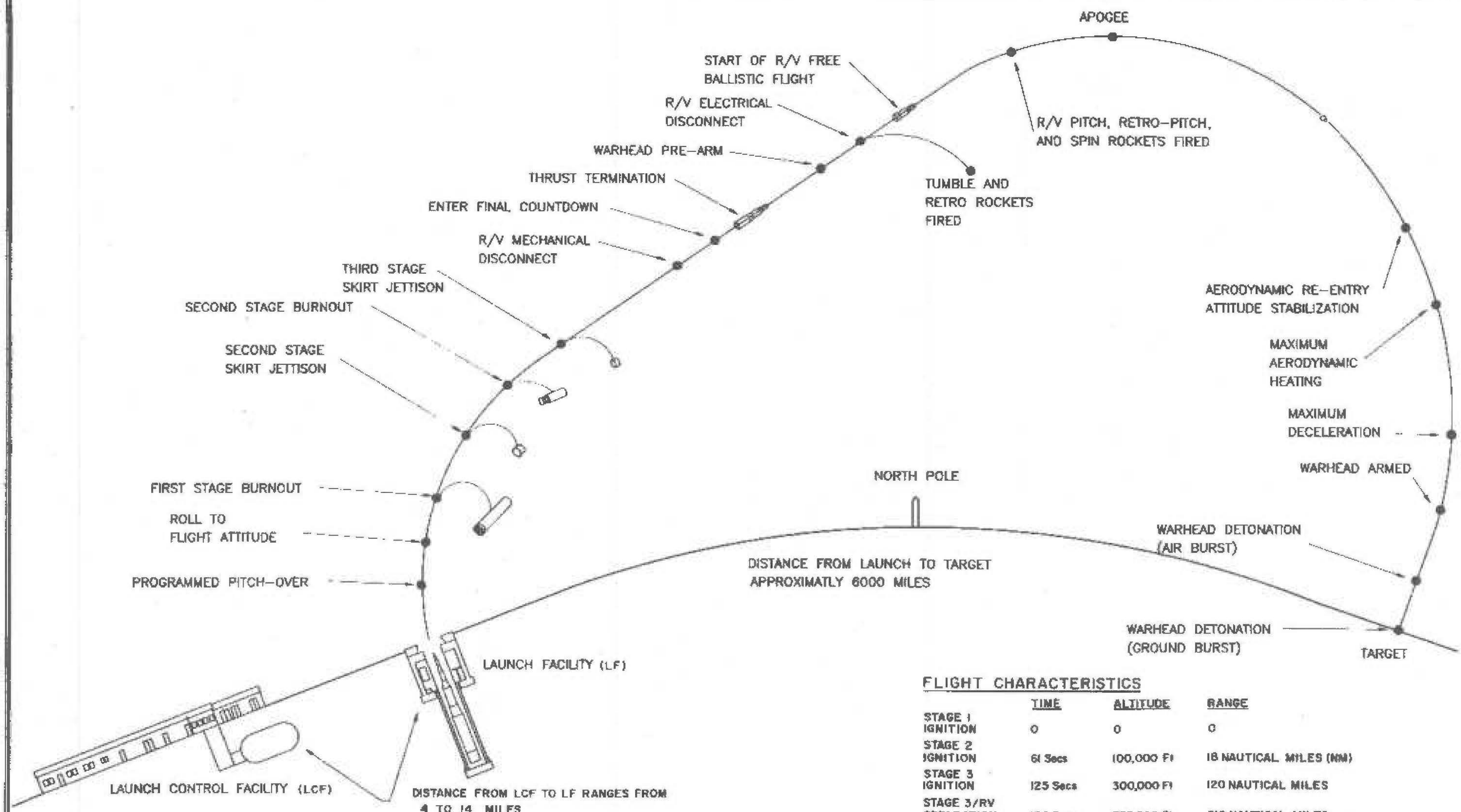
ROCKY MOUNTAIN REGIONAL OFFICE: DENVER

ELLSWORTH AIR FORCE BASE, DELTA FLIGHT, LAUNCH CONTROL FACILITY

RAPID CITY VICINITY — MEADE COUNTY — SOUTH DAKOTA

SHEET 1 of 2

HISTORIC AMERICAN ENGINEERING RECORD SD-50-A



FLIGHT CHARACTERISTICS

	TIME	ALTITUDE	RANGE
STAGE 1 IGNITION	0	0	0
STAGE 2 IGNITION	61 Secs	100,000 Ft	18 NAUTICAL MILES (NM)
STAGE 3 IGNITION	125 Secs	300,000 Ft	120 NAUTICAL MILES
STAGE 3/RV SEPARATION	186 Secs	750,000 Ft	210 NAUTICAL MILES

FLIGHT SEQUENCE

NO SCALE

DELINEATED BY: GREGORY B. MACK

ROCKY MOUNTAIN REGIONAL OFFICE: DENVER

ELLSWORTH AIR FORCE BASE: DELTA FLIGHT, MINUTEMAN II ICBM

RAPID CITY VICINITY MEADE COUNTY SOUTH DAKOTA

SHEET 1 of 1

HISTORIC AMERICAN ENGINEERING RECORD SD-50-B

in late 1992 and early 1993 to discuss the results of the planning document, progress of the HAER documentation, and feasibility of preservation, and to tour the Launch Facility and Launch Control Center.

Considering the work by the National Park Service in the initial Legacy effort, it was unanimously agreed to proceed with an extension of the project. The Air Force Federal Preservation Officer had recognized the significance of the resource, and support for the project was also received from the Major Command, Missile Wing Commander of Ellsworth, the Air Force Museum at Wright-Patterson Air Force Base, Ohio, several Congressional Offices, and the National Park Service.[10] Missileers who had served on alert in the Launch Control Center also voiced their concurrence. Based upon the success of these meetings, the demolition schedule was altered so that two MMII facilities associated with Ellsworth Air Force Base, Delta Nine Launch Facility, and Delta One Launch Control Center, were placed last on the list to be destroyed, so that a National Park Service Special Resource Study to determine the feasibility and suitability of preserving them as historic sites could be completed.[11] The Air Force and the National Park Service have entered into several Interagency Agreements to accomplish the work to date.[12] Additional partnerships have been formed with interested parties including the South Dakota State Historic Preservation Office, the South Dakota State Department of Tourism, Badlands National Park, the Air Force Museum based at Wright-Patterson Air Force Base, Ohio, the University of South Dakota, and the South Dakota Air and Space Museum.

The immense logistics involved with potentially preserving the Launch Facility and Launch Control Center quickly became apparent, and if not for the dedication of those involved might have seemed insurmountable. First and foremost was the ability to prove to an international audience that the facilities would be retained as static displays and count against a small number of such displays allowed by the START. Federal real estate procurement history had to be researched, contracts with local power companies re-negotiated, classified materials discussed, hazardous materials disposed of, security on the vacant remote sites addressed, and decisions made on even the smallest detail, the retention of "everyday" items associated with the facilities. These included furniture, user manuals, hand-written notes on the control panels, appliances, and uniforms, all to aid in the proper and authentic interpretation of the site.

As a result of the ongoing study and in anticipation of the sites becoming a facility receiving the general public, the Air Force has prepared a nomination of the MMII Delta One Launch Control Center and Delta Nine Launch Facility as a National Historical Landmark.

With the rapid demise of the Cold War, Ellsworth and the MMII facilities were the setting for another historic event; the visit in December 1993 by General Colonel Igor Sergeyev, Commander in Chief of the Russian Strategic Rocket Forces. This was the most improbable group of visitors ever received at an American ICBM facility. Invited by Lieutenant General Dirk Jameson, Commander of Ellsworth Air Force Base, Sergeyev and his entourage toured the silo and launch control center, the very objects of their target for the past thirty years. The event was documented by journalist Ed Bradley and a film crew for an episode of the news magazine "60 Minutes."[13]

Notes

[1] The introduction of the MM missile facilitated the retirement of Atlas and Titan I missiles in 1965, after only six years in service. It gave the U.S., for the first time, a turn-key nuclear warfare capability. The Air Force had a static display of a Titan missile complex (site #8: 571-7) listed in the National Register of Historic Places in 1992, and currently rents the facility to the Pima County Museum as a joint effort of Davis Monthan Air Force Base, Arizona. The facility is open to the public.

[2] As a result of the documentation on these particular facilities, the Air Force has funded a FY94 project to document all MM artwork painted on the blast doors by the missileers, a contemporary version of the mural paintings painted on the war planes of World War II.

[3] National Historic Landmark Nomination, currently in draft. The Ralph M. Parsons Company of Los Angeles provided the standards and plans for the MM facilities. Peter Kiewit Sons Company of Omaha served as the general contractor. The American Bridge Division of U.S. Steel, Los Angeles, fabricated the steel components. The work was supervised by the Army Corps of Engineers and the Boeing Company.

[4] The MMII missile differed from the MMI version by retrofitting internal systems to increase range, computer storage of eight targets, improved accuracy, and penetration aids to overcome anti-ballistic missile defenses. Launch Facilities, Launch Control Centers, and ground equipment were retrofitted to accommodate the MM model.

[5] Department of Defense Appropriations Act, 1990, Public Law No. 101-511, Section 8120, 104 Stat. 1905.

[6] Ibid. Legislative purpose #9. The Cold War Task Area of the Legacy program oversees the various projects concurrently funded with Cold War themes, and published a report on activities entitled, "Coming in From the Cold; Military Heritage in the Cold War," Summer 1994.

[7] Funding has been as follows: FY91 $10 million, FY92 $25 million, FY93 $50 million, FY94 $50 million, and anticipated in FY95 $50 million. The four services, the Air Force, Army, Navy and Marine Corps, each actively participates in the program.

[8] FY 1992 project #518c. Department of Defense, Office of the Deputy Undersecretary of Defense for the Environment, Legacy Resource Management Program FY92 Demonstration Projects Report to Congress, 1992, page 309.

[9] An "Interim Guidance for Cold War Resources" for U.S. Air Force installations was signed by Brigadier General James E. McCarthy, the Air Force Civil Engineer, on 29 June 1993. It encouraged interaction with State Historic Preservation Offices and the Advisory Council on issues surrounding buildings, sites, objects, and structures associated with the Cold War that may be eligible for inclusion in the National Register. Mr. Gary D. Vest, Deputy Undersecretary of the Air Force for Environment, Safety, and Occupational Health, was the Air Force Federal Preservation Officer at the time.

[10] Greg Kendrick, Chief, Branch of History, NPS Rocky Mountain Regional Office, has coordinated the effort and the feasibility study to date. Others involved early in the program included Mr. Gary D. Vest, the Air Force Federal Preservation Officer at the time; Dr. Paul Green, Cultural Resource Manager for Air Combat Command; Dr. Dan Friese, the Cultural Resource Manager for Ellsworth Air Force Base; Colonel Tom Boland, Forty-fourth Missile Wing at Ellsworth Air Force Base, South Dakota; and the author.

[11] The study is currently underway by the NPS Rocky Mountain Regional Office. The sites were chosen due to their association with early implantation of MMII at Ellsworth, unaltered appearance, and their close proximity of location to major interstate routes, Badlands National Park, and Mount Rushmore.

[12] The Air Force has led activity since the original Army-led Legacy funding to include activities undertaken and associated with the Special Resource Study and "mothballing" of the site during FY93 and FY94.

[13] "Russian ICBM Commander Visits," *The Plainsman* 16 (no. 50, 10 December 1993, Ellsworth Air Force Base, South Dakota).

Documenting South Carolina's Military Bases and Cold War Legacy

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In the 1990s, for the first time, cultural resources from the recent past are being viewed as worthy of documentation and preservation before they become seriously endangered. This sea change presents the preservation community with the opportunity to be more active participants in the appraisal and selection of cultural resources for documentation and preservation. This said, the volume of resources, the complexity of the organizations that created them, and the lack of a historical perspective challenge the preservation community to adopt new documentation strategies, analytical techniques, and planning practices before preservation can proceed. The development of a method to document resources from the recent past has been the work of the University of South Carolina (USC) Legacy Project for the past three years.

In a remarkable display of forethought, Congress recognized that resources from the Cold War should be examined before time takes its toll. The Defense Appropriations Act of 1990 established the Legacy Resource Management Program that directed the Department of Defense to "determine how to better integrate the conservation of irreplaceable biological, cultural, and geophysical resources with the dynamic requirements of military missions." The bill established nine separate legislative purposes, the last of which was: "to inventory, protect, and conserve the physical and literary property and relics of the Department of Defense, in the United States and overseas, connected with the origins and the development of the Cold War."[1] To carry out this initiative, the Cold War Task Area was established and competitive grants awarded for demonstration projects.[2] This established both a mandate and funding mechanism to seriously begin the process of examining resources from one of the pivotal events from the recent past: the Cold War.

In 1992 the University of South Carolina's Applied History Program applied for a demonstration project, known as the USC Legacy Project, to systematically inventory and collect state-wide information about sites, documents, and objects in South Carolina associated with Department of Defense installations in the Cold War period, 1945-1991. To accomplish this broad scope of work, the USC Legacy Project developed a new documentation strategy and methodological approach that is intended to serve as a model for additional Cold War studies as well as the study of other areas of modern society. This model should be especially useful for examining other late twentieth-century resources created by large and complex bureaucratic organizations, such as colleges, universities, governments, franchise companies, and multinational corporations.

From the perspective of the waning decade of the twentieth century, it is clear that events have occurred since World War II, like the Civil and Human Rights movements and the Cold War, that are of such transcending importance that it is not necessary to wait fifty years to recognize their importance and begin the process of recording and preserving the resources that tell their stories. However, the long-standing argument, especially in the historic preservation community, has been that time needs to pass (a minimum of fifty years in most cases) before there is enough distance to achieve a historical perspective. Therefore, the USC Legacy Project

was presented with a conundrum: how to document something for which we lack the necessary historical perspective.

The first reaction was to focus solely on the "exceptional," or, in other words, those things that in the mid-1990s are readily identifiable as being significant manifestations of the Cold War, such as nuclear weapons and weapons systems development, political and foreign policy, intelligence gathering, and the various "hot" conflicts of the period. While we felt it was safe to assume that future generations also will consider these topics significant, we feared that such an approach would bias and distort the historical record by excluding information that future historians might find valuable. A useful comparative example is the historical record of the American Civil War. The battles, tactics, leaderships, and politics are well documented because they were recognized as important in the years immediately following the war. However, such things as the lives of common soldiers, training, medical care, and life on the home front, which are of great interest to modern scholars, are extremely difficult to reconstruct because the documentation of these activities was not recognized as important in the years immediately following the war, and, as a result, the resources were allowed to deteriorate.

In an effort to be as objective as possible, the USC Legacy Project adopted a broad and inclusive definition of the Cold War and its impacts. Additionally, it was decided that all Department of Defense activities in the 1945-1991 period were related to and shaped by the Cold War. This capacious approach seeks to include the exceptional and the unique (a building that might qualify as a National Historic Landmark, for instance), but also the ordinary and typical (the records and artifacts that enable us to understand everyday life on a military base from the perspective of a new recruit, to take another example). Due to this broad approach, the inventory produced by the project should permit the writing of social and cultural histories of the American military during the Cold War, as well as the more traditional institutional histories oriented to specific services, units, and bases.[3] While future scholars with more historical perspective may determine that such an approach is unwarranted, it ensures that future generations will have the necessary contextual information to make that determination.

The difficulty of using a broad perspective when examining an event of the recent past is the sheer volume of material that remains. In 1991 the Department of Defense controlled twenty-five million acres of land on which were located hundreds of bases and installations. South Carolina alone had seven major bases, representing all four services, that operated throughout the Cold War period: the Army's Fort Jackson; Charleston, Myrtle Beach, and Shaw Air Force Bases; Charleston Naval Base; the Marine Corps Recruit Depot, Parris Island; and the Marine Corps Air Station, Beaufort. In addition to these large bases there were smaller facilities like the Naval Hospital, Beaufort; National Guard installations, such as McEntire Air National Guard Base; and installations that closed during the Cold War period, the largest of which in South Carolina was Donaldson Air Force Base. In comparison to some other states the military presence in South Carolina is relatively small, but the military's holdings in the state consist of tens of thousands of acres of land, on which are located thousands of buildings and structures. This accounting takes into consideration neither the millions of objects that were used nor the hundreds of feet of records that were produced by South Carolina's military installations in the past forty-six years. The obvious conclusion that is reached when confronted by numbers this daunting is that it is impossible to assess historical significance, even for this very small portion of the military's total domestic holdings, through the traditional preservation practices of either simple enumeration and description of individual resources or thematic groupings. Therefore, a new approach had to be developed.

The solution that the USC Legacy Project chose in designing its documentation strategy was to focus on what the military did by using "functional analysis."[4] Fundamental to the documentation strategy is the principle that to understand a complex institution, the function of its various parts must be clearly understood. Such an approach shifts the focus from the actual resource to the conceptual context of its creation. This approach differs from traditional practice in cultural resource management, which tends to focus on the resources themselves. Instead, the USC Legacy project focuses on the functional operation of the Department of Defense in order to organize the inventory of cultural resources that tell the Cold War story in South Carolina.

Functional analysis is a way to transform the question "What needs to be saved in order to

document the Cold War at South Carolina's military entities?" into an analytical process that ensures that the full scope of activities and evidence are considered. By asking "What are the functions of a particular military installation?" a holistic understanding of that installation can be gained. By focusing on what an institution does, functional analysis helps guarantee the inclusion of those activities and people that may have left few resources or are considered to be of little significance today. This methodology identifies types and categories of resources that are worthy of preservation or collection and places them into a contextual framework. The significance of individual resources subsequently can be evaluated in reference to these categories, and the quality of information they provide about a particular function can be determined.

In identifying the functional categories, the USC Legacy Project sought to identify the minimum number of functions that reflected the full range of activities of the Department of Defense during the Cold War. Although a basic understanding of the organization under study is necessary to complete this task, the goal and mission statements that most organizations produce make easier work of determining a list of functions. For the Department of Defense, the USC Legacy Project identified seven major functions: Train Personnel, Foster Socialization, Sustain the Institution, Ensure Defense, Conduct Offensive Operations, Undertake Research, and Provide Public Service. While it was believed at the time of their drafting that all the functions would be present at each installation under study, a conscious decision was made not to rank the functions in any manner. Ranking, it was felt, would unnecessarily introduce additional biases by focusing attention on some functions to the exclusion of others and thus negate the benefit of using this approach. Upon researching the history of each function at each installation, it was found that all the functions were indeed present at each installation, but that the level of emphasis of each function varied from installation to installation. For example, ensuring defense played a bigger role at the Charleston Naval Base than at the Marine Corps Recruit Depot, Parris Island, which focused on training.

After identifying the functions, a working definition for each was developed. The definitions that the USC Legacy Project developed for the seven functions of the Department of Defense are:

Train Personnel describes the teaching and learning process needed to prepare personnel for the military mission, the types of information conveyed, the methods by which knowledge is conveyed, and how the processes are evaluated.

Foster Socialization includes the activities that facilitate development of the "military culture" as a common set of group values and that enhance the quality of life at an installation by providing for the general welfare of military personnel and their families. These activities include promoting universal rules of conduct; fostering patriotism and esprit de corps; providing for physical, spiritual, and psychological needs; and encouraging family and community life. Examples include military ceremonies and celebrations, recreation and leisure facilities, churches, counseling and mental health centers, family housing, child care centers, clubs, post exchanges, and beautification projects, among others.

Sustain the Institution refers to the organizations, operations, and facilities that support the military mission of the installation. These include providing and maintaining base property like transportation, water, sewer, electricity, and communications systems, as well as furnishing command offices, accounting and payroll services, and base security and law enforcement. Examples include water towers, radar and antenna arrays, barracks, warehouses, mess halls, repair and maintenance facilities, and hospitals, among others.

Ensure Defense refers to the activities that protect the United States, its possessions, and interests against enemies both foreign and domestic.

Conduct Offensive Operations is, together with the preceding function, the reason that the federal government maintains the Department of Defense. This function describes the activities of the military that uphold and advance the national policies and interests of the United States abroad.

Undertake Research includes activities involving data collection, experimentation, analysis, or deductive reasoning that attempt to acquire knowledge of the unknown for the purpose of improving the advantage, efficiency, or quality of the military and its missions.

Provide Public Service includes those activities that provide direct and tangible benefits to the civilian population and society at large. These

may include activities such as assistance during disasters, educational and training programs for civilians, support to scouting groups, ordnance disposal (as of war souvenirs, Civil War munitions, and homemade bombs), and open houses at bases.

The functions and definitions are intentionally broad to capture the full range of the military's activities. As the definitions make clear, the military conducted many activities for which there is ample documentation as well as some that left few resources and are therefore more difficult to document. For example, in conducting offensive operations there exists a comprehensive written record of each mission the military engaged in, the units involved, the number of troops and their objectives, the types and numbers of weapons employed, etc. Training, on the other hand, is more difficult to document fully. Training manuals and course curricula exist, but the actual teaching and learning processes left few resources.

The identification of activities that left few resources is one of the objectives of the USC Legacy Project. By inventorying multiple resource types (sites, documents, and objects), categories of resources can be found that document nearly every activity. However, there will remain some activities for which there is little documentation. Identification of these activities creates an understanding of where gaps exist in the documentary record and will allow managers to collect the necessary information to fill the gaps. While it is highly unlikely that there will be substantial efforts made to construct a historical record for activities that left few resources, it is nonetheless valuable to know where gaps exist in the historical record.

For activities that are well documented, the functional analysis methodology does not stop with the simple identification of all available resources. The final step in the process is analyzing the ability of the information provided by particular resources to document the various functions. Identifying the quality of information allows for the rational selection of resources for preservation. This is critically important for resources from the recent past, because of the quantity of resources that managers will have to contend with. This problem is being faced today in government archives that are straining to manage the vast quantities of recently created material coming into their possession. In the not so distant future, the museum and historic preservation professions also will begin to struggle with ever larger quantities of resources. For this reason it is important to ask what is the quality of the information provided by resources from the recent past. Simply trying to manage quantity without analyzing quality will waste scarce financial resources and will not insure that our generation passes on a broad, inclusive, and usable historical record.

There are two good reasons for examining resources that were created in the recent past. The first is that resources considered to have some permanent value in our time can be preserved for future generations to appreciate before the ravages of time diminish their integrity. While this is a noble endeavor that should be undertaken, the second and more long-lasting reason is that now is the best time to study the entire record and determine what we want to pass on to the future. At no other time will the historical record be more complete. The degradation of the historical record is an amazingly fast process. In just four years, base closings and reorganization in the military have resulted in the loss of countless resources associated with the Cold War and graphically demonstrate the need for interested parties to become involved in the process of planning for the preservation of these resources sooner rather than later. The Cold War initiative of the Legacy Resource Management Program and the National Park Service's Preserving the Recent Past conference are beginning the process of creating an awareness that attention needs to be paid to the events and resources of the recent past. The success of these and future efforts will be measured by the historical record that we leave to future generations. If we do our jobs well, they will receive a legacy that will allow them to view our history as we have not been able to view our ancestors'.

Notes

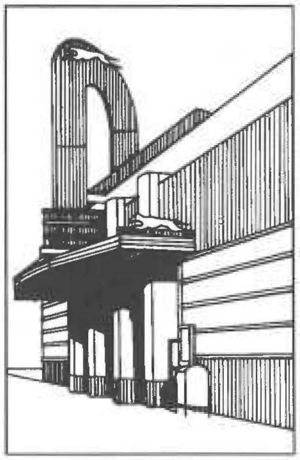
[1] Department of Defense Appropriations Act, 1990, PL [Public Law] No. 101-511, Sec. 8120, 104 Stat. 1905 (1990); Office of the Deputy Assistant Secretary of Defense for the Environment, "Legacy Resource Management Program Statement of Purpose," *Legacy Resource Management Program, Report to Congress, September 1991*, 2-3.

[2] The Legacy Program is administered by the Deputy Under Secretary of Defense, Environmental Security (DUSD-ES). Within each military department, the Deputy Assistant Secretary, Environment, manages Service- and installation-related

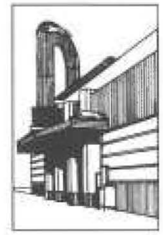
Legacy activities such as the demonstration projects generated by that service. The Cold War Task Area is responsible to the Legacy Resource Management Program director within DUSD-ES. During FY 1993 the Task Area was administered jointly by the Army and Air Force, since FY 1994 by the Air Force.

[3] The USC Legacy Project, *The Cold War in South Carolina, 1945-1991: An Inventory of Department of Defense Cold War Era Cultural and Historical Resources in the State of South Carolina , An Interim Report, September 1993* (Columbia, South Carolina: The USC Legacy Project, Department of History, University of South Carolina, 1993), 2.

[4] The inspiration for using functional analysis as a documentation strategy came from Helen Willa Samuels, *Varsity Letters: Documenting Modern Colleges and Universities* (Metuchen, New Jersey, and London, England: The Society of American Archivists and The Scarecrow Press, Inc., 1992). The USC Legacy Project is the first to employ the methodology of functional analysis to document cultural resources, including buildings, structures, landscapes, and objects, in addition to documents.



The Suburbs



Interpreting Post-World War II Suburban Landscapes as Historic Resources

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The suburban landscapes that developed around American cities after World War II are among the most significant historic resources of the twentieth century; they represent the fulfillment of the dream of home ownership and material well-being for a majority of Americans. In them, a distinctive settlement pattern emerged, centered on the single family house on its individual lot sited within the large-scale, self-contained subdivision with a curvilinear street pattern. It was a landscape in which the free market attempted to meld the attributes of the city and the country into a home environment sought by many Americans. As Richard Longstreth has pointed out, "Never before has such a great segment of society been able to partake of this kind of environment, nor will it again in the foreseeable future."[1]

The post-World War II suburban landscape has also been one of the most condemned of American landscapes. Its architectural uniformity was indicted in the 1950s as a manifestation of a increasing conformity in American society. In the 1960s, suburban prosperity was blamed for draining cities of their economic and social vigor. Today suburban development has been accused of representing the American dream run amuck as sprawling subdivisions make metropolitan areas less workable. For many then, thinking about the post-World War II suburbs as historically significant is a contradiction in terms.

But that is so also because the suburbs have been seen as a new landscape form. As Peter Muller points out "[t]he scale of suburbanization was so greatly enlarged after 1945 that it quickly became the conventional wisdom that suburbia did not occupy a major position in the national urban life until the opening of the post-war era."[2] Certainly in the extensive territory they occupied, the manner in which they were developed, and the resulting dispersed pattern of settlement, they were new. At the same time, however, they were also the product of a process that had been at work for nearly three-quarters of a century by the time World War II ended. By the end of the 1930s, nearly all of the elements necessary for the post-World War II suburban landscape to develop were in place. This paper looks first at the historic continuum of suburban development from which the post-World War II suburbs emerged and then considers some of the interpretation and preservation issues inherent in how they developed.

Suburbanization first emerged as an important trend in urban development in the 1880s with the electrification of the streetcar. Streetcar suburbs grew until 1918. Early automobile suburbs developed after World War I until the end of World War II. The post-World War II suburban boom created what have been called the freeway suburbs. But it was the streetcar that created the modern metropolitan area as a settlement form - as an urban region made up of a high-density central city surrounded by lower-density suburbs whose residents commute daily to jobs in the central city. In short, the metropolitan area is a twentieth century American invention. The streetcar greatly increased the area available for residential development by making it possible to travel ten miles from downtown in thirty minutes.[3] Linear residential neighborhoods grew up along the new streetcar tracks extending radially from the city.

Although still on gridded streets for the most part, the cheaper land beyond the urban core allowed for houses to be built on their own lots. The streetcar not only opened land for residential development, but laid the skeleton for the new emerging metropolitan area: the network of crosstown and circumferential routes created nodes of new development signaling the end of the single-center city and lines into the countryside facilitated the growth of exurban settlements and satellite towns that drew later suburban development.[4] Metropolitan areas were first recognized by the United States Census in 1910.

Conceived of as historic landscapes, suburbs can be thought about on a continuum from the smallest to the largest physical geographical unit that makes up this landscape. The metropolitan area is the largest landscape in which distinctive suburban landscape characteristics can be seen. At the other end of the continuum, the smallest landscape unit is that icon of American suburban development - the single family house on its own lot. But the most critical landscape unit, and the building block of the suburban landscape, is the residential subdivision.

It is, however, hard to capture the sense of the suburbs simply by describing them physically. In a larger cultural sense, suburbs are significant because they represent the fulfillment of deeply held values about home in American society. Robert Fishman in his recent book *Bourgeois Utopias:The Rise and Fall of Suburbia* summarizes the values that created suburbia as follows:

> Suburbia is more than a collection of residential buildings; it expresses values so deeply embedded in bourgeois [or middle-class] culture that it might be called the bourgeois utopia. Yet this utopia was always at most a partial paradise, a refuge not only from threatening elements of the city but from discordant elements in bourgeois society itself.[5]

Fishman notes how suburbanization in the twentieth century differs from that of the nineteenth:

> If there is single theme that differentiates the history of [the] twentieth-century suburb from its nineteenth-century antecedents, it is the attempt to secure for the whole middle class (and even for the working class as well) the benefits of suburban development which in the nineteenth century had been restricted to the...elite alone.[6]

Historian Kenneth Jackson, author of *The Crabgrass Frontier*, believes that the invention of the balloon-frame method of construction in the 1830s made as important a contribution to lowering housing costs as did the cheap sites made available by the transportation innovations of the electric trolley and automobile.[7] The application of mass-production methods to housing construction by the Levitt brothers in building their post-World War II Levittowns was perhaps the culmination of this trend.

As important as reducing the cost of land and buildings in making suburbia affordable to large segments of the American population was the change in the way housing purchases were financed. The long-term, fixed rate mortgage was invented in the 1930s. With the Federal Housing Act of 1933, the federal government stabilized housing finance by insuring mortgages through the Federal Housing Administration (FHA). The lowering of down payments and monthly payments through federal insurance reached its ultimate after World War II as part of the benefits provided to veterans by the federal government.

It was, however, the introduction of the automobile, in many ways the most important event in American landscape history, that triggered large-scale suburbanization. Automobile ownership in the United States went from four vehicles in 1894, according to the Federal Highway Administration, to nearly twenty-seven million by 1930. Henry Ford introduced the Model T in 1908.[8] In *Making a Middle Landscape*, Peter Rowe asserts that the two most intense episodes of suburban expansion took place from 1918 until after the Wall Street crash of 1929, and from 1945 to the present.[9] It was during the first period that two of the hallmarks of the American suburb took their modern form adapted to the automobile: the subdivision and the single-family house. As the automobile freed developers from building within walking distance of streetcar lines, they were able to adapt the principles of the low-density, self-contained, curvilinear residential developments of the elite to the middle-class and working-class automobile-oriented suburb.

Jackson has described the American suburb in one sentence: "affluent and middle-class Americans live in suburban areas that are far from their work places, in homes that they own, and in the center of yards that by urban standards elsewhere are enormous."[10] Fishman stresses that "[t]he suburb must be large enough and homogeneous enough to form a distinctive low density environment defined by the primacy of

the single family house set in the greenery of an open parklike setting."[11] According to Spiro Kostof, the first picturesque suburb in the United States was probably Glendale, Ohio, founded in 1851.[12] Llewellyn Park, New Jersey, designed by Alexander Jackson Davis and built in 1857, is more commonly acknowledged as the picturesque prototype. In its design, Davis introduced the curvilinear road and natural open space in the center, two features that, according to Jackson, were unprecedented in modern residential experience.[13] When we look at the evolution of the modern suburban subdivision, however, we are also looking at the evolution of modern urban and town planning.

If the picturesque upper-class developments, such as Llewellyn Park in New Jersey or Riverside near Chicago, provided the template for the site plan of the modern subdivision or suburban community, other events articulated it. The Chicago World's Fair of 1893, beneath its Classical Revival facade, promoted the idea of comprehensive planning. In Great Britain, Ebenezer Howard's Garden City movement provided instruction for combining the best qualities of city and countryside.[14] In the United States, planners sought to find design solutions to the onslaught of the automobile, which was not only killing more and more pedestrians, but according to a leading planner of the time, Clarence Perry, cutting the city up into cellular blocks. To counter this, Perry proposed something he called the "neighborhood unit" as the basic unit of urban residential development. The neighborhood unit was a self-contained neighborhood of about five thousand residents centered on an elementary school. Bounded by arterials, the neighborhood unit would be bypassed by through traffic and have an internal street system of varied layout. Defined this way, the neighborhood unit became a basic design template for laying out residential neighborhoods in North America, Great Britain, and Australia.

The principles of the neighborhood unit concept were immediately refined in Radburn, New Jersey, designed by Clarence Stein and Henry Wright in 1928 and opened in 1930.[15] Even more so than the neighborhood unit, Radburn was designed to incorporate the automobile into residential development in the safest way possible. It did so by introducing the superblock and separating pedestrian and vehicular traffic. Radburn also introduced the cul-de-sac. In the superblock, the houses faced on to a park and a system of sidewalks for pedestrians. Automobile access was provided to the rear of the houses by a roadway that formed the spine of the superblock. The houses were clustered around cul-de-sacs along this central road. Pedestrians could go from superblock to superblock by tunnels under roadways.

A design concept influenced by Radburn that arose in the greenbelt communities built by the federal government in the 1930s, according to Peter Rowe, was the use of loop roads and cul-de-sacs, or motor courts, leading off major collector streets.[16] In later practice the houses were turned around to face the cul de sacs and common park land allocated to individual lots. Out of these developments in the 1920s and 1930s evolved the curvilinear subdivision layout that became the standard site plan of post World War II subdivisions. Descended from the organic curves of the nineteenth-century picturesque developments, the curvilinear plan, when compared to the grid by its advocates, provided greater privacy, could be adapted to a greater variety of topography, and avoided dangerous four-way intersections. It also, when built at large scales, according to neo-traditionalist planners and critics such as Philip Langdon, led to the loss of community in residential neighborhoods.[17]

Yet, the subdivision was only the setting for the dominant feature of the suburban landscape, the single-family house. Rowe has reflected that, "No other artifact is as pervasive or carries the same emotional charge as the detached house in its suburban garden."[18] Although the streetcar suburbs made the free-standing house more common, reaction against the Victorian style of display and early twentieth-century reformist pursuit of a good and proper American home led to the development of a series of new, single-family house types. Among the six identified by Rowe as having been built since the 1920s, the bungalow, the Colonial Revival house and the ranch house best illustrate the trends in suburban housing.

Consequently, just as the form and plan of the residential subdivision evolved during the first four decades of this century, so too did the single-family house that it sited. As important as the model subdivision plan developed in the 1920s and 1930s was its institutionalization through zoning and subdivision regulations. In 1928, the US Supreme Court upheld the constitutionality of zoning in which the exclusively

residential development of single-family houses was supported as the most inviolate of land use zones.

Thus, although we tend to think of suburbs as a post-World War II phenomenon, they have a rich history of evolution for almost a century before the war. Many would argue that the quality of American residential design - and town planning, for that matter - reached a peak in the late streetcar and early automobile suburbs. We find the prototype of the post-World War II and contemporary subdivision almost fully developed by 1940. What was required for the second period of explosive growth was the post-World War II baby boom and pent-up demand for housing.

Post-World War II suburban growth was indeed monumental. From 1918 to 1940, suburbanites grew modestly from seventeen to twenty percent of the nation's population. By 1960, however, they had doubled to account for forty percent of the nation's total and far more than doubled in absolute numbers.[19] Physically, the post-war suburban landscapes differed in five ways from the pre-war prototypes according to Jackson.[20] First, they were in more peripheral locations relative to the central city; second, they were of lower densities than their prewar counterparts; third, architectural similarity characterized both houses and subdivision design nationally; fourth, suburban housing was more easily available economically then ever before; and fifth, and perhaps the most important characteristic of the postwar suburbs in Jackson's view, they were economically and racially homogeneous.

While suburbs built after 1945 exhibited a great increase in the numbers of properties, they also appear to manifest fewer types of properties both in house types and subdivision designs. As mentioned earlier, Rowe identified but six major types of suburban housing as having been built since the 1920s, of which three - the bungalow, the Colonial Revival house, and the ranch house - are the most common.[21] Larry Ford traces the decline of the regional diversity of American housing types to the introduction of the bungalow at the turn of the century.[22] Because of this simplification of housing types and subdivision design, frequently denigrated as "cookie-cutter tracts," post-World War II suburbs have frequently been dismissed as not worthy of preservation and condemned as "lacking the character, scale, variety and even sense of purpose possessed by the standard products of earlier generations."[23]

Yet, as has been shown, these development have a long history embedded in significant trends in American history. Even the most modest bungalow, reflecting the need for an affordable single-family house for households without servants, finds its architectural origins in the ideology of the Progressive movement about home and in the work of architects such as Wright and Greene and Greene.[24] The trend to fewer, more straightforward suburban house types culminated in the quintessential American suburban single-family house of the 1950s - the ranch house. Yet even in its simplest, even ticky-tacky form, it too claims a long architectural lineage. Presumably tracing its origins to western ranch houses, the architectural inheritance of the ranch house owed much to Frank Lloyd Wright's Prairie Style houses and later Usonian houses of the 1930s.

As Lizabeth Cohen suggests, the apparent simplification of the suburban house was influenced by complex social change. Conceived as a temple to the family, space in the 1950s suburban home was not divided into public and private or family areas as in the nineteenth-century middle-class home. "[A]ll domestic space was intended for family use - not reserved for formal self preservation to the outside world through parlors and dining rooms, nor for official business, through libraries and offices."[25] Cohen sees the changes in the layout of the home as a transition from patriarchal space to female space with reproduction at the center. Others interpret the social implications of the ranch house differently. The point is that beneath the stereotypes about post-World War II suburbs is as rich and varied an historic resource as any yet encountered.

Even the impression of the uniformity of the suburban tract houses can be found to be misleading upon close inspection, as demonstrated by a survey of a subdivision in the suburbs of Wilmington, Delaware, of what appeared to be basically uniform ranch houses built in the 1950s.[26] Intensive survey revealed that the developer had managed to produced forty-seven different versions of the same house by flip-flopping floor plans, by varying the placement of houses on their lots and by applying five different schemes of architectural ornament. In fact, there may have been more variety in that neighborhood than in many

eighteenth-century city neighborhoods cloaked in Georgian uniformity, which no one would question as being architecturally significant.

The thesis here is that there can be no question that post-World War II American suburbs are historically significant. The real question is in determining what range of resources best represents suburban development and how these resources are significant. In determining significance, we must let the results of our research define the objects, structures, buildings, and landscapes that are important, rather then starting with preconceived notions of what is "historic." In this, we need to balance the recognition that the post-World War II suburban landscape is rooted in long-term trends of American urban development, while at the same time taking a unique mid-twentieth century form.

In addition to subdivisions and homes, the list of suburban properties that are becoming historic is long. As the physical manifestions of what he called the "drive-in culture," Jackson includes the garage, the motel, the drive-in theater, the gasoline service station, the shopping center, the house trailer, and the mobile home.[27] Recently, Larry Ford has outlined a topology of commercial strips.[28] It starts with Main Street as the original strip, moves to the "Early Automobile Strip," to the "Streamlined Automobile Strip," and finally, to the "Classic Automobile Strip." For those who need stylistic designations to deal with these suburban historic resources, Tom Wolfe's "Boomerang Modern," from his book *Kandy-Kolored Tangerine Flake Streamline Baby* may yet find its way into the National Register of Historic Places. For those committed to keeping preservation in contact with the most significant historical events in the twentieth-century United States, the post-World War II suburban landscape will be the defining resource.

Notes

[1] Richard Longstreth, "When the Present Becomes the Past," *Past Meets Future: Saving America's Historic Environments*, Antoinette J. Lee, editor (Washington, D.C.: The Preservation Press), 219.

[2] Peter O. Muller, *Contemporary Suburban America* (Englewood Cliffs, New Jersey: Prentice Hall, 1981), 51.

[3] Paul L. Knox, *Urbanization: An Introduction to Urban Geography*, (Englewood Cliffs, New Jersey: Prentice Hall, 1994), 89.

[4] Kenneth T. Jackson, *Crabgrass Frontier: The Suburbanization of the United States* (New York, New York: Oxford University Press, 1985), 90.

[5] Robert Fishman, *Bourgeois Utopias: The Rise and Fall of Suburbia* (New York, New York: Basic Books, 1987) 4.

[6] Fishman, 15.

[7] Jackson, 124-138.

[8] Federal Highway Administration, *Highway Statistics: Summary to 1985*; Federal Highway Administration, *Highway Statistics 1990*; as cited in Knox, 107.

[9] Peter G. Rowe, *Making a Middle Landscape* (Cambridge, Massachusetts: MIT Press, 1991), 4.

[10] Jackson, 12.

[11] Fishman, 5.

[12] Spiro Kostof, *The City Shaped: Urban Patterns and Meanings Through History* (Boston, Massachusetts: Little, Brown and Company, 1991) 73.

[13] Jackson, 78.

[14] Edward Relph, *The Modern Urban Landscape* (Baltimore, Maryland: The Johns Hopkins University Press, 1987), 56.

[15] Relph, 65.

[16] Rowe, 200.

[17] Philip Langdon, *A Better Place to Live: Reshaping the American Suburb* (Amherst, Massachusetts: The University of Massachusetts Press, 1994).

[18] Rowe, 67.

[19] Muller, 51-52.

[20] Jackson, 239-241.

[21] Rowe, 68.

[22] Larry Ford, *Cities and Buildings: Skyscrapers, Skid Rows and Suburbs* (Baltimore, Maryland: The Johns Hopkins Press, 1994), 151.

[23] Longstreth, 214.

[24] Rowe, 68.

[25] Lizabeth Cohen, "Middle-Class Utopia? The American Suburban Home in the 1950s," a paper presented to the Delaware Seminar in American Art, History, and Material Culture, 4 May 1993, 5.

[26] Susan Mulcahey Chase, David L. Ames and Rebecca J. Siders, *Suburbanization in the Vicinity of Wilmington, Delaware, 1880-1950±: A Historic Context* (Newark, Delaware: Center for Historic Architecture and Engineering, University of Delaware, June, 1992). Survey done as part of fieldwork for the report.

[27] Jackson, 246-271.

[28] Ford, 228-246.

Forgotten Environs:
Preserving Olmsted Brothers' Planned Communities

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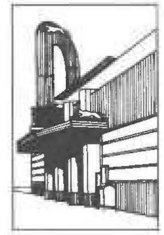
Abstract
In cities across the country, numerous planned communities remain unrecognized as discrete designed entities. Since their initial development, these neighborhoods have been subject to considerable alterations that threaten or obliterate their intended character. The failure to recognize their historic identities and design significance places their landscape values at greatest risk of loss.

Olmsted Brothers were responsible for work on a substantial number of these communities. Planned as multi-village settlements linked by roadway networks; or as smaller subdivisions at the urban edge or along transportation corridors; or as industrial villages for particular businesses; or as groupings around a recreational node, country club, or resort, these designed neighborhoods were diverse in scale, character, and ownership patterns. Additionally, the firm planned communities for specific institutional purposes, college campuses, and settings for sanatoria.

In all of these examples, pressures to meet new and expanding needs have fostered growth and change without adequate consideration of the design heritage of these communities. The design philosophy and development for several representative projects illustrate the significant elements that provide an Olmsted-designed community with its distinctive character. Only with identification and analysis combined with appropriate educational outreach can we begin to develop adequate mechanisms for protection and preservation of landscape legacy.



Surveying the Suburbs: Back to the Future?

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At the conclusion of the architectural inventory of Durham, North Carolina, for which I was the principal investigator, I presented slides to the state's National Register Advisory Committee of all of the properties I had identified as potentially eligible for the National Register of Historic Places. This meeting occurred in 1981, when I was a graduate student in my late twenties, but I have never forgotten the reaction of one of the middle-aged committee members when I showed a slide of a house in a proposed district, a 1920s bungalow with a flared roof and a small balcony that looked like a cross between a Swiss chalet and a Japanese tea house. He laughed and exclaimed, "I grew up in a house like that. That can't be historic!" I was surprised. Clearly the house was *old*, built almost sixty years earlier, and certainly more architecturally distinctive that anything I had ever seen erected in the middle-class neighborhoods of my childhood. How could he not appreciate this well-preserved early twentieth-century neighborhood?

Now that the end of the century is upon us, those of us for whom surveying historic resources is a profession face the daunting task of recording the post-Word War II building boom, characterized by an explosion of suburbs. For several years, the survey programs of state historic preservation offices, charged with documenting historic properties and identifying those that are eligible for listing in the National Register of Historic Places, have inventoried historic suburban neighborhoods. With the passage of time and the rapidly increasing number of surviving suburban resources that are more than fifty years old, this mission is becoming more formidable. As we develop strategies for surveying historic resources just passing the fifty-year mark, it is useful to look back to the turn of the 1980s when we began to wrestle with the task of recording the suburbs of the early twentieth century.[1]

Nationally, the recording of historic properties was fueled by the celebration of our nation's Bicentennial in 1976 and the accompanying surge in interest in preserving our heritage. Many states had begun to record their historic properties following passage of the National Historic Preservation Act of 1966. As state historic preservation offices were established under the Act and staffs expanded with a combination of federal and state money, survey programs grew and developed. In the beginning the focus naturally was on the oldest and most architecturally distinctive properties. As federal funding increased, surveys became more sophisticated and comprehensive.

In North Carolina, state-sponsored survey of historic resources pre-dated the establishment of our State Historic Preservation Office. In the mid-1960s, the Department of Archives and History used a grant from the Richardson Foundation to hire two people who spent several days at a time in targeted counties with local historians recording the area's outstanding buildings. This program set the initial pattern for the State Historic Preservation Office that was created a few years later. Staff of the new office continued to make field trips to record the "best and the brightest," but now had the additional purpose of identifying properties to nominate to the National Register. The emphasis remained on those sites that individually were the most significant, but the approach was

not particularly systematic. Set by the local contacts who made the arrangements, the pace varied with the town or county and usually was unhurried. Photos were taken and written records made on simple forms consisting of a few printed blocks for basic information such as property name, location, and date; most of the forms were blank pages for the surveyor to write a description and whatever history could be gathered on-site and from archival sources.

In the late 1970s, North Carolina's State Historic Preservation Officer decided to expand the survey program by awarding a portion of the annual federal appropriation as matching grants to local governments and other non-profit agencies to hire professional consultants, or "principal investigators," to work in the field, while State Historic Preservation Office staff spent more time at their desks, managing the principal investigators.[2] Healthy competition for the grants among local co-sponsors indicated a growing appreciation for the early suburbs, originally outside city limits but now often part of the inner city. Young families were moving back into these areas and neighborhood associations were demanding renewed attention from local planning departments for revitalization assistance. Increased funding from the federal government and local sponsors resulted in a larger number of survey projects with each successive year, as well as more comprehensive coverage of each target area. Instead of focusing on late eighteenth- and nineteenth-century properties and recording only the most imposing of the early twentieth-century buildings, now full ranges of historic properties were recorded on complex forms. Thus, in North Carolina and across the country, early twentieth-century suburbs began to receive greater attention.

With close to seven million citizens, North Carolina is the tenth most populous state in the

A boldly detailed bungalow in the North Durham neighborhood (National Register 1985). How could this not be viewed as historic, even in 1981?

View of 1920s houses in the early twentieth-century neighborhood of Cameron Park in Raleigh, North Carolina, surveyed and nominated to the National Register in the early 1980s.

Union, yet our demographics set us apart from other heavily populated states. Almost half of our population is in urban areas, but most of our cities are small to moderate in size; our largest city, Charlotte, has less than a half-million people. They are composed of neighborhoods of freestanding, single-family houses closely spaced in city centers and occupying generous lots in the surrounding expansive, heavily landscaped suburbs interspersed with occasional two- and three-story apartment complexes. The multi-storied apartment buildings that characterize Richmond, the District of Columbia, and other metropolitan areas on the Eastern Seaboard occasionally punctuate North Carolina's major cities, where fewer than a dozen small blocks of row houses are known to have been built. In short, our urban areas are almost entirely suburban.[3]

This situation is rooted in nineteenth-century development. Urbanization occurred in a series of small cities along the rail lines connecting Wilmington on the coast with Raleigh, Greensboro, Winston, and Charlotte in the Piedmont and Asheville in the western mountains, yet by 1900 the state remained predominantly rural, with only ten percent of the population in urban areas. North Carolina soon joined the mainstream as multitudes moved from the countryside to towns and cities in search of employment. The boom stamped most of our urban fabric with an early twentieth-century look as earlier buildings were replaced in the city centers and developers rushed to accommodate the influx of people with suburban neighborhoods reflecting the increasing nationwide popularity of the streetcar and the automobile.

Despite the growth of most state historic preservation offices in the late 1970s, the task of surveying the early suburbs was enormous and time remained at a premium. With each passing year, the number of extant historic resources fifty years old and older was increasingly greater. Surveyors had to reconcile tight schedules and the growing number of sites to be recorded with the desire to gather as much information as possible on each property. Principal investigators for urban surveys no longer could spend an hour or more at each site; survey techniques had to be refined. Instead of devoting one survey form to each property, now multiple structures in units were treated on a single form. Cross-referenced from these "multiple structures forms," the more architecturally and historically distinctive properties, as well as representatives of each type, received additional documentation. This adjustment in methodology was just one step in a necessary and ongoing standardization and codifying of survey techniques that yielded gratifying results. By the early 1980s, all of North Carolina's major cities and many of the smaller ones had been surveyed to some degree, with the more recent projects embracing most if not all of the locales' early twentieth-century neighborhoods.

As surveys were conducted in Raleigh, Greensboro, Winston-Salem, Charlotte, Asheville, Durham, Wilson, Morganton, and elsewhere, and many of the early twentieth-century neighborhoods in these cities were nominated to the National Register of Historic Places, questions arose connecting the specifics of these neighborhoods to broader historical issues. Who were the developers and how did their other business interests tie into their residential projects? What was the effect of the development of electric power? What attracted home buyers to the suburbs? How did changing views of the family, the home, and the social roles of men and women shape these neighborhoods? How did the new suburbs reflect--and enforce--racial segregation patterns? What factors affected the selection and adaptation of national architectural models? What were the roles of the emerging urban planning movement and the planning profession in shaping the new suburbs as part of the larger city? Although these questions were just beginning to be asked, it was evident that important aspects of our urban growth were formed early in this century when clear-cut racial divisions of residential areas emerged; residential, business, and industrial uses became geographically separated; large, planned developments of similar houses in unified groups emphasized similar economic and social goals of the residents; and local governments strived to modernize utilities and transportation systems.[4]

The Survey and Planning Branch of the North Carolina State Historic Preservation Office knew that the principal investigators were beginning to find the answers to these questions. In 1983, we organized a conference that brought together historians and planners involved in studying and enhancing urban neighborhoods for a two-day symposium in Greensboro, North Carolina. Necessarily limited in scope, it focused on middle-class, chiefly white suburban developments of a few Piedmont cities. Principal investigators and professors of urban and

A typical streetscape in the early twentieth-century West End neighborhood of Winston Salem, North Carolina.

architectural history began pointing to answers to many of the questions we had all been asking. For example, it became clear that traditional involvement in numerous inter-related schemes such as trolley lines and development of the neighborhoods they serve, the waning attraction of city centers as places to live due to such factors as congestion and expanded commercial uses, shifting political forces associated with the expanding middle class, and the desire to publicly display their fortunes all contributed to southern entrepreneurs' strong interest in creating suburbs.[5] Participants left the sessions with both a better understanding of early twentieth-century suburbs and recognition of the need to examine the working class, African-American, and planned industrial neighborhoods of the period. Fortunately, the conference has continued to provide a useful reference for preservationists and scholars alike with the publication of all of the papers in 1985 as *Early Twentieth-Century Suburbs in North Carolina.*

The themes examined in the 1983 symposium, the associated questions, and the answers that began to be formulated remained relevant to the survey of suburbs for more than a decade. Throughout the rest of the 1980s, we continued to survey early twentieth-century suburbs, expanding the scope toward the eve of World War II with each passing year, although effects of the Great Depression slowed the rate of expansion somewhat. The methodology remained fairly consistent, with a continued reliance on multiple structures forms and the research guided by the questions posed in the early 1980s. While many of the target neighborhoods were those of the white middle class, important projects also were undertaken in African-American and industrial suburbs, which raised additional research questions. Not until the late 1980s was the applicability of the survey techniques and research questions developed almost a decade earlier tested in newer suburbs in the context of a comprehensive survey. In 1989 the governments of Greensboro and Raleigh applied for matching grants to conduct comprehensive surveys. Both cities had been selectively surveyed in the mid-1970s and had experienced notable growth in population and area since then.

Lasting two full years, the Raleigh survey was the more thorough of the two, with sufficient scope to adequately document the burst of late 1930s and early 1940s suburban developments. The technique of recording neighborhoods by block faces on multiple structures forms, cross-referenced to files on selected individual properties, remained the most efficient method, but the huge number of properties to be recorded in a relatively brief period--more than 3,000--demanded that cross-referenced files on individual properties be kept to a minimum and that a single entry for the entire group of properties in a multiple structures file be substituted for an entry on each building. Recognizing that it had taken a long time to garner the support for this project and that it probably would be many years before the city would have a comprehensive survey update, the scope of work was expanded to look at the suburbs of the 1940s and early 1950s, if only cursorily. For the newer neighborhoods, the multiple structures forms

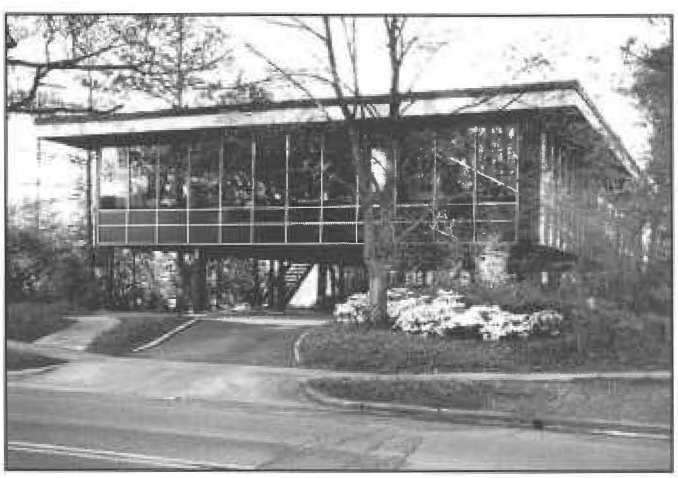
were utilized even more generally to convey an area's overall character.

The magnitude and limitations of the project required pragmatism. Helen Ross, the principal investigator was systematically working her way through the city geographically, beginning with the oldest sectors at the center. By the time she was ready to survey the newer suburbs at the fringes of the project area, many did not seem to merit more than the cursory pass she could give them because they already had lost much of their historical integrity due to remodeling, additions, infill construction, and even demolition of houses so that their lots could be subdivided for two or more new "mega-Georgians." This may have been our only opportunity to record many of Raleigh's mid-century suburbs, but already a "hot" real estate market and the desire for "bigger and better" were affecting survey methodology. These trends may ultimately render the mid-century suburbs unrecognizable as such by the time they are fifty years old. We cannot help wondering if we can justify stretching the scarce resources of a program devoted to identifying, protecting, and enhancing the state's historic resources for a thorough recording that very possibly may have no utility beyond the identification process.

During the project, the principal investigator was able to focus some attention on obvious architectural highlights of the 1940s, 1950s, and early 1960s. Raleigh is a fairly conservative city, but it is also home to the North Carolina State University School of Design, which recruited young leaders of the Modern Architecture movement for its faculty when it was established in the late 1940s. Between 1949 and the early 1960s, while affiliated with the school, these architect-professors and their associates designed buildings for themselves and their clients. Several of their designs, ranging from a "floating" office building of steel supports and curtain walls reminiscent of Mies van der Rohe's work to a sweeping wood and glass Usonian-type house inspired by Frank Lloyd Wright, were carefully recorded.

Analysis and evaluation of these later resources in the survey report did not fall within the scope of work for the project, but State Historic Preservation Office staff subsequently reexamined the buildings and developed sufficient context to place them on the state's list of properties that appear to be potentially eligible for listing in the National Register. Almost immediately, owners began to have nominations prepared, and within two years six of these "monuments of modernism," as they came to be known, were listed in the Register. The eagerness with which these owners sought recognition for their buildings told us they already understood how special these places are.

Strangely enough, development of the contexts for these nominations also contributed to our understanding of the far more typical mid-century suburbs of period dwellings and ranch houses because they were the environment in which the modern wonders were designed and constructed. This situation recalls previous initial explorations of "new" periods. Appreciation of Victorian architecture began with the spotlight on the most exuberant Queen Anne extravagancies, and within a few years serious



G. Milton Small & Associates Building, a Mies van der Rohe-inspired design built in 1966, Raleigh, North Carolina. (National Register 1994)

Fadum House, a Usonian house built in 1949, Raleigh, North Carolina. (National Register 1993)

attention was being paid to the neighborhoods of run-of-the-mill Victorian houses. Perhaps our experience with Raleigh's modern masterpieces signals a similar progression.

Evaluation has always been a crucial aspect of an historic resource survey. We are constantly making decisions about what to record and how thoroughly to do it and invariably judging the importance of properties against the National Register criteria. When we record neighborhoods, we are always on the look-out for potential historic districts. The broader scope of the recent Raleigh and Greensboro surveys revealed new difficulties in identifying these special areas. For example, suburbs of the late 1930s through the 1940s can be hard to read, frequently defying easy definition by date and style. Designs published by firms such as the Standard Homes Plans Company in rural Wake County, North Carolina, which has provided scores of designs for thousands of houses across North Carolina and much of the Southeast since the late 1920s, often remained in catalogues for years with few if any revisions. It is relatively easy to judge significance of styles and building forms dating prior to the late 1930s because they were associated with discrete periods and changes between them were distinct. Ten years ago, buildings that had not quite crossed the fifty-year threshold, which is a cardinal National Register standard, rarely got a second look. Little by little, as distinctions have become blurred, the tendency has been to automatically extend the period of significance for districts to the fifty-year cut-off. Perhaps we have been assuming that World War II would be the great divide, but as the recent surveys have proven, this is not the case.

So how do we decide what is significant after we have surveyed these "newly historic" suburbs, now or five or ten years on? Certainly, historic integrity, or degree of preservation, is a crucial determinant, but how do we set thresholds? Until more survey work is conducted, setting standards will be a challenge. It seems safe to say that the sheer magnitude of resources in the post-World War II suburbs demands a very high degree of preservation for consideration as an historic district. It also demands that significance, regardless of integrity, be articulated, so that the charge that preservationists label anything that is fairly intact and more than fifty years old as worthy of preservation is proven untrue.

We do not yet know the best approach to surveying and evaluating the more typical suburban buildings of the mid-twentieth century, but we imagine that development of larger contexts will affect the course. Right now, in the North Carolina State Historic Preservation Office, we are feeling our way, proceeding case-by-case and judging significance based upon our knowledge of the subject area and the broader contexts that are being developed. The traditional tension between survey and scholarship is changing, with survey, the basis for so much of our understanding of early twentieth-century suburbs, now seemingly more dependent upon scholarship for evaluation of field work in the newer suburbs. Studies by sociologists, authorities on city and regional planning, economists,

From the exterior, this house looks as if it could have been built in the 1930s. In fact, it dates to the early 1950s (102 King Charles Road, Raleigh, North Carolina).

In 2010, the house may officially be considered historic. It is impossible to predict if it will retain sufficient integrity to be evaluated as significant.

and political scientists are revising our research questions and providing answers to them. While many of the questions applied to early twentieth-century suburbs remain relevant, additional ones are pertinent: How did the nature of suburbs change? What were the goals of veterans and their young families? What were the effects of new government programs that made low-interest loans available? How did the new tract houses reflect and shape ideals of family life? What were the impacts of technological developments and highway construction? Did restrictive covenants in middle-class subdivisions still forbid people of color from occupying houses except as servants? Did the big developers have the same sorts of varied business interests as their predecessors?

It is too early to predict how our post-World War II heritage will be treated as historic resources. Certainly, their identification and evaluation will require the strong interest of state historic preservation offices, which must strive to resolve numerous troublesome issues associated with these tasks. Many factors will come into play in this tricky business, to which our own sensibilities and those of the general public will be brought to bear. In the constant interplay between the goals of preservationists, academic research, and the desires of the public that directs survey work, it is the third element of this triumvirate, public interest, that may become the most crucial. Charles Lockwood noted in a December, 1994, column on "edge cities" that "most suburban downtowns lack the

historical, cultural, educational and sentimental associations that have enabled many of our traditional downtowns to change, survive, even prosper in recent years."[6] How strong are these associations in residential subdivisions? As ever greater budget cuts loom, will there be financial support for recording the newer suburbs except through government-mandated environmental impact studies, which themselves may soon be subject to radical modification in the spirit of reinventing government and protecting private property rights?

In any event, it is the responsibility of preservation professionals to foster interest in historic resources, no matter how recent they are. Just as those of us who entered this field twenty years ago view bungalows as marvelous and special, we have to recognize that the 1950s, that golden age of family values, has its own aura. Already I can imagine a presentation to our National Register Advisory Committee in the year 2005 by a young professional for whom the film *American Graffiti* is not a memory but a period piece. As a slide of a pristine one-story ranch with picture windows shaded by metal awnings, imitation wrought iron railings at the front steps, and a jalousie-windowed breezeway leading to a one-car garage flashes on the screen, I fully understand those comments made in a similar meeting in 1981 as I bite my tongue to keep from exclaiming, "That looks like the house my parents built. That can't be historic!"

Notes

[1] The author would like to thank Catherine Bishir for her guidance and support in preparing this article. Her knowledge and insight gained as head of the North Carolina State Historic Preservation Office from 1973 to 1986 and currently as survey coordinator and senior architectural historian are invaluable.

[2] This practice continued after 1980, in addition to the pass-through of ten percent of the state's annual federal appropriation to local preservation undertakings mandated by the CLG program.

[3] Catherine W. Bishir and Lawrence S. Earley, editors, *Early Twentieth-Century Suburbs in North Carolina* (North Carolina Department of Cultural Resources, 1985), 3.

[4] Bishir and Earley, 5.

[5] David R. Goldfield, "North Carolina's Early Twentieth-Century Suburbs and the Urbanizing South," *Early Twentieth-Century Suburbs in North Carolina,* Catherine W. Bishir and Lawrence S. Earley, editors (North Carolina Department of Cultural Resources, 1985), 14-15.

[6] Charles Lockwood, "Edge Cities on the Brink," *Wall Street Journal* (21 December 1994).

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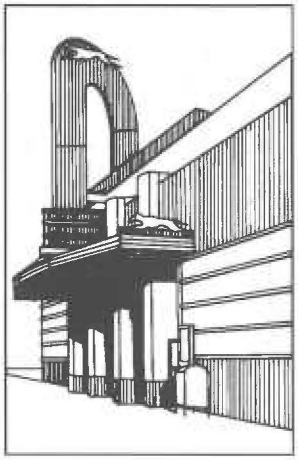
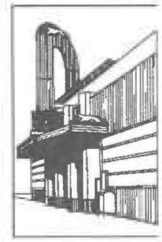


From Graceland to the Promised Land: Places Associated with American Music



Graceland and Sun Studio

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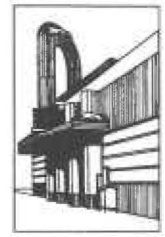
Abstract
From 1957 until his death in 1977, Graceland was the home of Elvis Presley, the undisputed king of rock and roll. The house was built in 1939 for Dr. and Mrs. Thomas Moore in what was then suburban Memphis. Designed by the locally prominent architectural firm of Furbringer and Ehrman, it was a good, although not atypical, example of Neoclassical design in Memphis. Presley bought the property soon after his first successes and immediately began to alter the property to suit his lifestyle.

Graceland was listed in the National Register in 1991. To fans and historians of music, it may seem clear that the property should receive recognition for Presley's importance in modern music, but to historians, architectural historians, and historic preservationists, the eligibility was not self-evident. Although there area other sites associated with Presley, no one argued strongly that Graceland was not his legacy and the landmark best associated with him. Yet some questioned why this relatively new house and new singer should be recognized as historically significant. The property did not fit within the National Park Service's guidelines for properties that are not yet fifty years old. This criterion consideration states that, in order to list historic properties and those not of "passing contemporary interest," buildings not yet fifty years old can only be listed if they have exceptional significance. Do Presley and Graceland have exceptional significance, or shouldn't we wait and give the property recognition in 2027? Conversely, why recognize the house when it is Presley's music that is important?

There were also questions about the motives for the nomination. It was not prepared by Graceland, but they did cooperate with the author of the nomination and concurred that it should be listed. Surely, they had no interest in history? Didn't they simply want more publicity for the site, which hosts hundreds of thousands of visitors each year from around the world. And hadn't the house been changed when it was made into a museum? Was it really like this when Presley lived here? These questions were answered satisfactorily and the property was listed in the National Register of Historic Places.



Landmarks of Chicago Blues and Gospel: Chess Records and First Church of Deliverance

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For most of its first twenty years of existence, the Commission on Chicago Landmarks has been largely concerned with the protection of the city's world-famous collection of late-nineteenth and early-twentieth century architecture: the skyscrapers and early commercial buildings of the Loop, the mansions of the Gold Coast and the Near South Side, and a variety of Prairie School residences.

On at least two occasions in the last few years, however, the Commission has headed in an entirely new direction, from the well-traveled paths of architects Louis Sullivan and Frank Lloyd Wright to that of such influential musicians as Chuck Berry, Dinah Washington, and Muddy Waters.

In 1989, the Commission designated an otherwise nondescript, two-story building at 2120 South Michigan Avenue as a Chicago Landmark, due to its use between 1957 and 1967 by Chess Records, one of the principal music labels associated with the development of American blues and rock and roll. And, in 1994, a former hat factory building at 4315 South Wabash Avenue was given city landmark status, partly because of the importance of its longtime occupant, the First Church of Deliverance, to the development of American gospel music in the 1930s and 1940s.

The process of landmarking these two buildings, particularly in the case of Chess and its interior design, has proven to be a new and enlightening challenge that has altered the way the Chicago preservation community looks at recent-date historic sites. It also raises several questions about how to document these modern sites, and the need for new research techniques.

The Chess Records Story

In contrast to the finely detailed buildings that authenticate the works of Chicago's turn-of-the-century architects, Chess Records was a raucous, streetwise business rough-hewn out of the city's streets. Leonard and Phil Chess were tough-talking Polish immigrant brothers who captured the distinctive sound of Chicago's African American blues performers of the 1950s and 1960s on record, forever altering the course of American musical history.

Many other companies, such as Cobra, J.O.B., and VeeJay also helped to make Chicago a vibrant musical recording center in the mid-1950s. A few of their buildings - such as Cobra's studios in the 2800 and 3400 blocks of West Roosevelt Road and the Universal Studios at Rush Street and Walton Avenue - are still standing. However, the Chess building at 2120 South Michigan Avenue is probably the most intact, and important, survivor.

The brothers had established themselves in the operation of nightclubs on Chicago's South Side in the 1940s. Catering primarily to a black clientele, the Chess brothers recognized the commercial potential of the local musicians who performed in their clubs. In establishing Aristo-

The two-story, terra cotta-clad facade of the building at 2120 South Michigan Avenue in Chicago is unremarkable except for its former use as the home of Chess Records from 1957-1967. Chess and its recording artists were instrumental in the development of American blues and rock and roll music. (Photo courtesy of the Commission on Chicago Landmarks)

crat Records in 1947, they sought to capture the intensity of these performances on record.

From the beginning, the Chess brothers made their label a forum for the rugged, emotional sound of "Mississippi Delta," country blues. Among the roster of blues artists recorded by Chess throughout the 1950s were Muddy Waters, Howlin' Wolf, Sonny Boy Williamson, Little Walter, and Willie Dixon, the latter being a multi-talented composer, bass player, and producer who had a major impact on the creative direction of the Chess label. Equally important were the contributions of Chess Records, and its subsidiary Checker Records, in the early rock and roll recordings of Bo Diddley and Chuck Berry. Leonard Chess' first office was in a small storefront at 2300 East 71st Street. The following year he moved to a new storefront location at 5249 South Cottage Grove Avenue, where the operations remained for three years. The label changed its name to Chess in 1950 and Phil Chess joined his brother full time.

From 1951 to 1954, when ten records produced by Chess made the national hit charts, the company operated out of a storefront at 750 East 49th Street. Between 1954 and 1957, its headquarters was a double storefront at 4750-4752 South Cottage Grove Avenue.

Several of these early buildings still remain, but the best known Chess address - and the one that the City of Chicago chose to designate as a landmark - is the two-story building at 2120 South Michigan Avenue, where Chess Records operated from 1957 to 1967. Many of Chess' most influential recordings were made here, including "Johnny B. Goode," "Rescue Me," "Red Rooster," and "I'm a Man."

In addition, "2120" is the address that many musicians have long equated with the Chicago blues sound. In the 1960s, several British rock groups came here to record, including the Rolling Stones ("12 x 5") and the Yardbirds, and the building itself has continued to be a tourist mecca for blues fans from around the world.

The Story of First Church of Deliverance

In contrast to Chess Records, the story of First Church of Deliverance is a less transient one. It was founded in 1929 as a small congregation on South State Street, but since 1933 it has continuously occupied the building at 4315 South Wabash Avenue.

The reasons for the building's designation as a Chicago Landmark principally relate to its unique Art Moderne style of design, which is quite unusual for a house of worship. But an equally important part of the church's history relates to its influential role in the general acceptance of gospel music.

Under the leadership of its longtime pastor and founder, Rev. Clarence H. Cobbs, First Church was one of the earliest African American churches to broadcast its services on the radio, beginning in 1934. (One of the earliest radio ministries in the US dates to 1921 at WHT in Chicago.)

While spiritual music had always been an integral part of First Church services, it was largely through its weekly radio broadcasts that the Church became widely known as a national center of gospel music. An *Ebony* magazine article called Rev. Cobbs "the most popular Negro radio minister in the U.S.," and noted that his broadcasts were heard by more than one million listeners.[1]

First Church of Deliverance, shown here shortly after twin towers were added to the Art Moderne-style building in 1946, following a major fire. Visible atop one of the towers are speakers that broadcast the church's services to the street. Radio broadcasts of First Church's services helped to popularize modern gospel music. (Photo courtesy of the Commission on Chicago Landmarks)

Although gospel music had deep roots in African American culture, it emerged as a popular musical style only in the 1930s. Thomas Dorsey, the longtime music director of Pilgrim Baptist Church on Chicago's South Side, is considered the father of American gospel music, having set his church's hymns and spirituals to a more secular, syncopated jazz/blues beat.[2]

In 1937, less than a mile away at First Church of Deliverance, Rev. Cobbs had hired organist and composer Kenneth Morris to be his gospel choir director. Morris and music director Julia Mae Kennedy quickly established a musical program that began to attract local and national entertainers.

Jazz/blues singer Dinah Washington frequently sang at the church with the Sallie Martin Singers, and trumpeter/singer Louis Armstrong also took part in musical events. Other notable musicians who have either made recordings in the church or been otherwise associated with its musical programs include Nat King Cole, Earl (Fatha) Hines, Delois Barrett Campbell, and Billie Holiday, who, church lore maintains, often brought her pet chihuahua to Sunday services.

In addition to Morris' influence as choir director and organist (e.g., he introduced the Hammond electric organ to gospel music), he and Sallie Martin, who is often acknowledged to be the "mother of gospel music," wrote and published numerous gospel standards, including Mahalia Jackson's "Dig a Little Deeper" and "How I Got Over," the theme song of First Church of Deliverance.

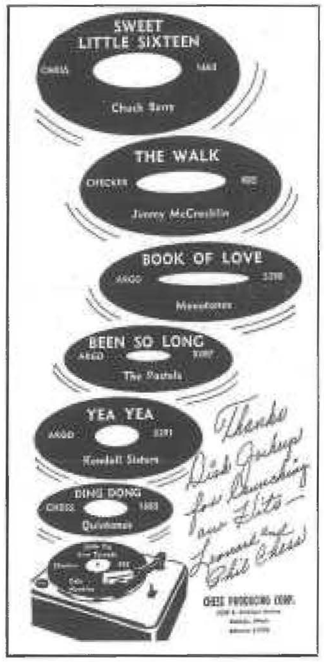
According to national gospel authority Beatrice Johnson Reagon, Morris and Martin "were among the vanguard of musicians who began...the changes that occurred in gospel music during the 1930s and 1940s."[3]

The "Fugitive Nature" of Research

In order for a building - or object or district - to be considered for city landmark status, it first has to be recommended to the City Council by the Commission on Chicago Landmarks, a nine-member board appointed by the Mayor. The Commission's decisions are aided by a research staff that is now a part of the Department of Planning and Development.

In late 1988, when the Commission staff proposed landmark designation of the Chess Records headquarters, it was unsure of how the Commission would react to the proposal. With a period of significance spanning a decade in the 1950s and 1960s, Chess Records was the most recent-date site ever proposed for Chicago Landmark status. Furthermore, the notion of designating a building that was related to recent musical genres was far from the Commission's more common themes of architecture and history.

The building itself also was problematic. Part of the significance of the site was that the Chess Brothers had made an impact on the course of international popular music while working out of makeshift quarters in a small, two-story loft building in an unglamorous commercial district, immediately south of downtown Chicago. Sited amid other small-scale buildings, the twenty-



Promotional literature for Chess Record Company, shortly after it moved its operations in 1957 to 2120 South Michigan Avenue. (Photos courtesy of the Commission on Chicago Landmarks)

five-foot-wide terra cotta front of the Chess Records building was well designed, but unexceptional in its architectural composition.

It was also a somewhat sobering experience to research something of such recent vintage. While this enabled the Commission's staff to talk to many of the people who were actually involved in the history of the building - including many very knowledgeable musicians, recording engineers, and visitors - the divergent recollections of these observers, especially compared to actual site evidence, demonstrates the vulnerabilities and potential inaccuracies in researching recent history. It also provides a wonderful reality check about the presumed accuracy of our research of the more distant past, where the opportunities to talk to actual participants are not possible.

As it turned out, Chess was a very "workaday" place. The alterations to the 2120 South Michigan Avenue building were done quickly and inexpensively to serve a specific purpose, with little aesthetic forethought. Many of the original participants interviewed by the Commission's staff were amused by the interest shown in the exact details (history, construction materials, chronologies, etc.) of a business and building they thought of in an everyday casual manner.

Through building inspections, personal interviews, and research in numerous, thirty-year-old music trade journals, the history of the building was gradually pieced together.

Historic Fabric...of the 1950s
Originally erected in 1911 for an auto parts dealer, the building was later used for the wholesaling of neckties and upholstery slipcovers. In 1956-1957, it was remodeled as the headquarters of Chess Records, in order to give a modern appearance for the growing company and to combine office, studio, stock room, and shipping facilities.

Normally, these alterations would be considered to be obtrusive and inappropriate changes for a 1911 building. In this case, however, they constituted a "historic fabric" that was integrally tied to the period of the building's musical significance.

The building's granite- and terra cotta-framed first floor had been replaced in 1956-1957 by composition stone cladding and a stock brushed-aluminum storefront. The interiors were cos-

Many of the record company studios that made Chicago a center of blues and rock and roll music in the 1950s and 1960s were housed in low-scale commercial buildings. Since 1989, when this photo was taken of Chess Records' former home (1954-1957) at 4752 South Cottage Grove Avenue, the ornamental terra cotta panels have been removed by vandals. (Photo courtesy of the Commission on Chicago Landmarks)

metically altered with a typical, late-1950s build-out that included redwood paneling and "lannon stone" facing for walls, fluted translucent glass for office partitions, and ceilings of drywall and perforated acoustical tile. The studio and other parts of the building continued to evolve during occupancy by Chess, as engineers and recording technologies rapidly changed.

Furthermore, after Chess moved out in 1967 (to 320 East 21st Street), more changes occurred, as the building was remodeled for a dance and theater studio run by a former Chess studio manager. Later, the building was bought by a former Chess musician and remodeled again. Consequently, by the late 1980s, the building contained layers of paneling, ceiling tile, and other materials reflecting these various changes. The preservation challenges, needless to say, are unusual; how, for instance, *do* you date such recent materials as 1950s, versus 1970s, drywall.

The only evidence of the original floor plan for Chess Studios was a set of drawings filed with the city for its building permit in 1956. However, there was a significant divergence between these drawings and what could be observed by a thorough inspection of the building today, including such major changes as the location of stairs and walls.

A major discovery - made subsequent to the landmark designation research - was obtained through contact with Jack Wiener, an original Chess engineer who was responsible for the build-out of the entire 1956-1957 remodeling. He revealed that the plans filed with the city were almost completely thrown out and redone at the time of the remodeling, particularly in the second floor studio area. (A particularly sobering discovery for those of us who depend heavily on official permit drawings.) Site investigation further revealed that the wall configuration of the 1956-1957 interiors were more intact than staff had originally surmised.

As for First Church of Deliverance, the changes that were made to its interior have been minor. As a result, the research into this structure was much less complicated and the major concerns have focused on the church's largely unaltered terra cotta-clad, twin-towered exterior.

The Landmark Process

In the case of Chess Records, staff had initially feared there would be difficulty in getting the nine-member Landmarks Commission Board to designate something so recent, so modest, as a Landmark. Early on, this fear was confirmed when one commissioner asked: "What's a Chess Records?" Despite that one query, however, the fact that the music *was* so well known to most of the Commissioners actually helped contribute to its acceptance.

It turned out that a mere mention of the song "Johnny B. Goode," recorded by Chuck Berry at the Chess Studios in 1958, was an immediate touchstone to most of those involved. At one City Council meeting, an alderman - in fact, an oft-time foe of landmarks - noted, "Yeah, I always liked that song," and voted for designation.[4]

The proposed designation of the Chess Studios also generated widespread public interest. News of its proposed designation immediately made the front page of the Chicago newspapers and spread across the country in magazine articles and radio and television broadcasts - something never experienced even in the cases of the most famous and threatened Sullivan and Wright buildings.

A live radio broadcast from the building in 1989 by musician John (Cougar) Mellencamp urging listeners to write to the Landmarks Commission to "save" the building generated hundreds of letters, even though most had mistakenly interpreted this announcement to mean the building was threatened by demolition.

Since the building was designated a landmark in 1989, the Commission's staff has assisted the building's new owners, Blues Heaven Foundation (founded by the late Willie Dixon), to determine an appropriate restoration plan. The building's "period of significance" was determined to be pre-1960, which was the time when the studio was remodeled for multi-track recordings.

Fortunately, both pre-1960s engineers are alive and willing to work with the foundation to reconstruct the original appearance and equipment. While the studio's most important music was recorded pre-1960, this period of restoration unfortunately will not reflect the appearance that was seen later by the Rolling Stones, the Yardbirds, and other music groups who later recorded there.

In addition, there remains the challenge of restoring materials and equipment which, while cheap and improvised in the 1950s, are ironically difficult and often costly to duplicate today. This includes: solid redwood paneling, Flutex ribbed glass, acoustical walls of pyrobar furred out with drywall held by spring clips, original electronic equipment, rubber floor tile, and a basement echo chamber.

Furthermore, serious attention must be given to the repair and conservation of the building's 1950s-era storefront; for instance, what kind of finish was given to the aluminum at the time *and* what was the appearance of the original "2120" address sign itself. Few exterior photos survive, and memories of such minor details have predictably lapsed.

As mentioned previously, the issues pertaining to First Church of Deliverance, which was designated a Chicago Landmark by the Commission in 1994, were much less complicated than those of Chess Studios, largely because the major significance of the building was its distinctive Art Moderne style of architecture. In contrast, its landmark designation gained only a small amount of news coverage.

The lessons learned from these two designations - and from the on-site building research - should be both humbling and enlightening for preservationists. They point out the urgency of researching our recent musical past, particularly while the documentation and individuals connected to the buildings are still alive. These buildings also remind us that our sense of history can be found not only in the architectural plans of buildings, but in the diverse cultures of our communities.

Notes

[1] "Top Radio Ministers," *Ebony* IV (July 1949): 56-57.

[2] Pilgrim Baptist was designated a Chicago Landmark in 1981; the 1890-1891 building was designed by Adler & Sullivan.

[3] Beatrice Johnson Reagon, editor, *We'll Understand It Better By and By, Pioneering African American Gospel Composers* (Washington, DC, and London: Smithsonian Institution Press, 1992), 17.

[4] The same song also must have made an impact on NASA, which had sent a recording of that early rock 'n roll classic along on the unmanned Voyager probes to outer space.

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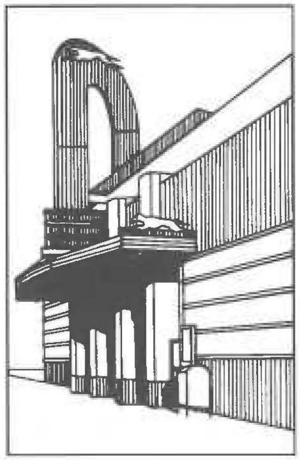
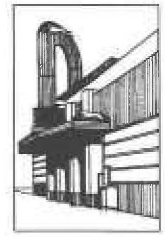


The American House: 1900-1960

American Single-Family Houses from 1935 to 1960, *Virginia McAlester*

Government-sponsored Prefabricated Housing, 1930-1950, *John Burns*

Now You're Cooking with Gas! Or, From Black and White to Color in the Kitchen and Why, *Phyllis M. Ellin*



American Single Family Houses from 1935 to 1960

Virginia McAlester
author of A Field Guide to American Houses
Dallas, Texas

The first half of the twentieth century saw a rapid expansion of single family housing for the middle class, a growth largely fueled by three economic innovations. First was the expansion of private mortgage banking, which was supplemented after 1930 by government loan programs, particularly those of the FHA and Veterans Administration. Next was the 1920s spread of zoning laws that restricted large areas of urban land to single family housing. Third was the evolution of large-scale land development and home building companies to take advantage of the first two trends.

The actual look and shape of the middle income houses that filled the mushrooming suburbs evolved in three major waves. First came the burst of early modernism that dominated from about 1900 to 1920. Second, the era of "period houses" during the 1920s and early 1930s; and third, the period with which we are primarily concerned, a second wave of modernism from about 1935 to 1960.

In the first period, wood-clad houses were the rule; these were predominantly one-story Craftsman bungalows, most commonly two rooms wide and three rooms deep. In a distant second place were the two-story "American four-square" homes with four rooms on each floor. These most commonly had vernacular Prairie-style detailing; Neoclassical and exaggerated Colonial Revival details were also used.

During the First World War inexpensive brick veneering techniques were perfected, and for the first time, "masonry" houses became widely available. This led to small-scale "period" cottages that mimicked their larger masonry forebears. The precise styles often were chosen from the then widely available books of photographs of historic European and earlier American houses. One-story brick Tudor cottages were the most common result across most of the country. In the Southwest and in California stuccoed Spanish Eclectic houses were common, and along the East Coast Colonial Revival styles tended to dominate.

By the mid-1930s, the automobile, which had spread rapidly since its introduction in the first decade of the century, began to be invited into the house. Before about 1940, automobiles were housed like their horse-and-buggy predecessors - in a carriage house built at some distance from the main house. By the mid-1930s, the convenience of attached garages began to win out over fears of gasoline fumes, and by 1950, most new homes featured built-in garages.

On the interior, a principal post-1940 change was the introduction of the den or family room, which soon became the largest room in the house. This was accompanied by partial openings between the kitchen and the den, allowing mothers doing the cooking to be in closer touch with their families. The traditional living rooms and dining rooms lost importance and often shrank to postage stamp-size. Other changes included a new emphasis on the "master bedroom" area, increasing closet and storage space of all kinds and an increasing number of bathrooms.

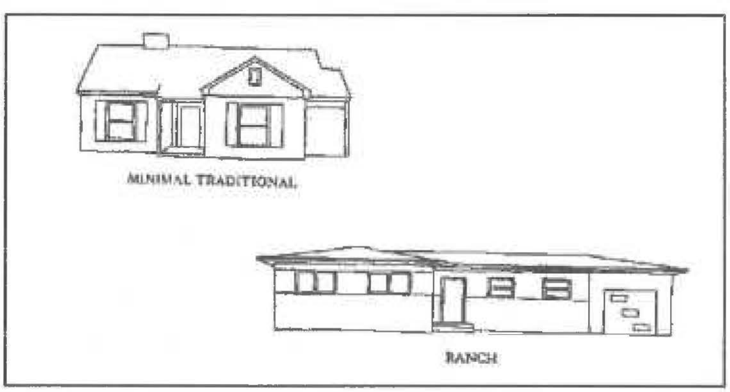
Four architectural styles dominated American house design from about 1935 to 1960: Minimal Traditional, Ranch, Split-Level and Contemporary.

The Minimal Traditional house was most popular from about 1935 to 1950. With the Depression of the 1930s came this compromise style that reflects the form of some of the earlier Period houses, but lacks their decorative detailing. Roof pitches were low or intermediate, rather than steep as in the preceding Tudor style. Eaves and rake were close, rather than overhanging as in the succeeding Ranch style. Usually, but not always, there was a large chimney and at least one front-facing gable, both echoing Tudor features. In fact, many examples suggested Tudor cottages with the roof line lowered and detailing removed. These houses were built in great numbers in the years immediately preceding and following World War II; they commonly dominated the large tract-housing developments of the period. They were built of wood, brick, stone, or a mixture of these wall-cladding materials. Although most were relatively small, one-story houses, occasional two-story examples are also seen. More commonly, two-story houses of the period have extra detailing and represent late examples of earlier "Period" styles, usually Colonial Revival or Monterey.

Ranch style houses were common from about 1935 to 1975. The style originated in the mid-1930s with the work of several creative California architects and gained popularity during the 1940s to become the dominant style throughout the decades of the 1950s and 1960s. The popularity of "rambling" Ranch houses was made possible by the country's increasing dependence on the automobile. Streetcar suburbs of the late-nineteenth and early-twentieth centuries still used relatively compact house forms on narrow lots because people walked to nearby streetcar lines. As the automobile replaced streetcars and buses as the principal means of personal transportation in the decades following World War II, compact houses could be replaced by sprawling designs on much larger lots. Never before had it been possible to be so lavish with land, and the rambling form of the Ranch house emphasized this by maximizing facade width (which is further increased by built-in garages that are an integral part of most Ranch houses).

Most Ranch houses were symmetrical one-story forms with low-pitched roofs. Three roof forms were used: the hipped version was probably the most common, followed by the cross-gabled, and finally, side-gabled examples. There was usually a moderate or wide eave overhang. This may be either boxed or open, with the rafters exposed as in the earlier Craftsman. Both wooden and brick wall cladding were used, sometimes in combination. Builders frequently added modest bits of traditional detailing, usually loosely based on Spanish, English Colonial, or French precedents. Decorative iron or wooden porch supports and decorative shutters were the most common. Ribbons of windows and metal casement windows were frequent, as were large picture windows in living areas. Partially-enclosed courtyards or patios, borrowed from Spanish houses, were a common feature. These private outdoor living areas to the rear of the house are a direct contrast to the large front and side porches of most houses built from 1900 to 1940.

The Contemporary style, built from 1940 to 1980, was a favorite for architect-designed dwellings



American single family houses from 1935 to 1960.

from about 1950 to 1970. It occurred in two distinctive subtypes based on roof shapes - flat or gabled. The flat-roofed subtype was a derivation of the International Style, a rare architect-designed style of the 1930s. These resembled the earlier style in having flat roofs and no decorative detailing, but lacked the stark white stucco wall surfaces, usually replaced by various combinations of wood, brick or stone. Landscaping and integration into the landscape were also stressed, unlike the pristine white International-Style house that was meant to be set upon the landscape as a piece of sculpture.

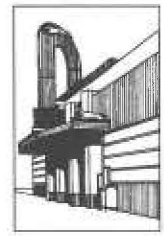
The gabled subtype was more strongly influenced by the earlier modernism of the Craftsman and Prairie styles. It featured overhanging eaves, frequently with exposed roof beams. Heavy piers sometimes supported gables. As in the flat-roofed subtype, various combinations of wood, brick, and stone were used and traditional detailing was absent. Both subtypes were most commonly one-story forms although two-story versions were not infrequent.

The Split-Level rose to popularity during the 1950s as a multi-story modification of the then dominant one-story Ranch house. It retained the horizontal lines, low-pitched roof, and overhanging eaves of the Ranch house, but added a two-story unit intercepted at mid-height by a one-story wing, creating three floor levels of interior space. An elaborate theory of interior planning grew around this form Families were felt to need three types of interior spaces: quiet living areas, noisy living and service areas, and sleeping areas. The Split Level form made it possible to locate these on separate levels. The lower level usually housed the garage and, commonly, the "noisy" family room with its television, which was becoming a universal possession. The mid-level wing contained the "quiet" living areas and the upper level, the bedrooms.

The Split-Level style shows a wide variety of wall cladding, often mixed in a single house. Decorative detailing of vaguely Colonial inspiration is somewhat more usual than on Ranch houses, probably because of the taller facades. Although found throughout the country, Split-Level houses are less common in the Southern and Western states than elsewhere.

In the late 1960s, increasing bits of "period" detailing began to be added to Ranch houses and Split-Level houses. By about 1980, a full-scale "Neo-"Period movement was underway. Homes built in new developments during the last fifteen years mimic almost every housing style found from about 1870 to 1935 - Colonial Revival, Tudor, Neoclassical, Queen Anne, Shingle, Folk-Victorian, and even Italian Renaissance. Conspicuously absent are the "Modern" styles that dominated the period from 1935 to 1960.

(The stylistic descriptions in this paper are from the author's *A Field Guide to American Houses*, New York, New York: Alfred A. Knopf, 1984.)



Technology and Housing: Industrialization, Standardization, and Prefabrication, 1930-1950

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Housing is the building type most susceptible to technological innovations. Housing may not be thought of as a big industry, but construction does represent a significant part of the American economy. While the housing market is huge, it is highly decentralized, being served by hundreds of small businesses, and thus does not look like a traditional conception of a "big" industry. The economic incentive to reach such a market is strong. While houses are produced in large quantities, they are each essentially hand made, making the process seem ideal for industrialization. Another impetus for change is found in the symbolic importance of housing in governmental programs. Housing is used as a social measure and as an instrument for implementing social policies. Finally, houses are small buildings, ideal for testing or demonstrating innovations on a small scale with limited risk.

Being decentralized, craft dominated, and locally regulated, controlled, and financed, the housing industry is naturally resistant to change. However, some innovations have made significant and lasting improvements in the housing industry. The most successful have not challenged the organization, or lack thereof, of the housing industry. Machine-made nails and the development of the balloon frame, and, later, the development of sheet materials such as gypsum board and plywood, are some examples. Alfred Bemis and his rationalization of construction and promotion of the four inch module brought dimensional order to house construction. The social and economic upheaval of the Great Depression and the federal efforts to relieve its effects, followed by the frenetic activities of the Second World War, had far ranging and lasting impacts on American housing. The mobilization for World War II created a huge construction program to house soldiers and defense workers that stressed standardization and efficiency. Following the war industrial technologies were refocused on the pent-up demand for housing. This paper will highlight just a few of the many efforts to industrialize, standardize, and prefabricate housing during this time period.

Even in the depths of the Depression, the housing industry was a considerable market. Manufacturers, faced with underutilized production capacity because of dwindling demand, were desperate to sell their products. Selling a few pounds of a product for every new home would be a sizable market. Major industries thus directed some of their research and development efforts toward the housing market. The housing industry, buffeted by same economic woes, was looking for innovations that could make homes more readily affordable. Traditionally a fragmented industry dominated by hundreds of small companies, the housing industry was notoriously slow to change, so opportunities for new materials and technologies were few. The upheaval of the Depression presented one such opportunity.

The approach most companies took was to industrialize housing by manufacturing components to be assembled at the job site. Steel, wood, and concrete were the most common materials. Composite materials using wood by-products, resins, and plastics were also developed. A major drawback was that while these components were standardized, there was no standardization among the manufacturers and hence, no interchangeability. Bureaucratic

resistance from building code and zoning officials, mortgage underwriters, and fire insurance companies was another major problem. Further, trade unions saw industrialized housing as a threat to their members. Despite all the obstacles, products made it to market and enjoyed some success. Unfortunately, the total effect was like a shooting star, interesting, attention-getting, but short-lived.

U.S. Forest Products Laboratory Demonstration House

Type:	Stressed skin plywood panels
Developed by:	Forest Service, U.S. Department of Agriculture
Demonstrated:	House Show, Madison, Wisconsin, 1935

The Forest Products Laboratory developed stressed skin panels using 4 foot by 8 foot plywood sheets glued to wooden frames; floor and roof panels were 5-3/8 inch thick and could span up to 13'-6"; standard wall panels were 1-7/8 inch thick. Rabeted mullions were used to join adjacent panels. The plywood projected 3/4 inch beyond edge of the frame to accommodate the mullions. Mullions of modified design were made for corners, sills, jambs and heads. Mastic was used to seal the joints. The model house was erected indoors under controlled conditions in twenty-one hours by seven men.[1] Constructed solely to prove the technology, the demonstration house made no attempt to be marketable.

Some of the panelized construction technologies developed at the Forest Products Laboratory were later used by manufacturers of prefabricated "demountable" houses erected during the build-up for World War II, most notably at Indian Head, Maryland.

General Houses[2]

Type:	Prefabricated steel panels
Developed by:	Howard T. Fisher and General Houses, Inc.
Demonstrated:	Century of Progress Exposition, Chicago, Illinois, 1934; moved to River Forest, Illinois, 1935

Architect Howard T. Fisher developed the idea of assembling houses from standardized prefabricated parts similar to the way General Motors assembled automobiles. The houses would not be standardized, just the component pieces, so that there could be an almost infinite variety of house designs. Individual houses would be custom built on site from stock components delivered by various suppliers from their warehouses.

General Houses' load-bearing wall panels were four feet wide and nine feet tall, fabricated from 14 gauge, rust resisting, copper bearing sheet steel, shop finished with red lead. The panel designs were simple and easy to form on bending jigs, thus not requiring expensive custom tooling. Joints were made by bolting through the turned edges of the panels. Mastic was used to waterproof the joints. Roof panels were similar, but of "battle-deck" construction, with an I-beam welded at the mid-point to give additional strength, and long enough to span the width of the house. The large and heavy roof panels had to be lifted into place with a crane, an expensive limitation. Interior surfaces of the wall and roof panels were finished with rigid insulation covered by wallboard.

In 1934, General Houses erected a demonstration home for the Century of Progress Exposition that reflected design changes from earlier models. Constant changes were a characteristic symptom among all the prefabricators as they tinkered with their designs. Open web steel joists supported the roof and floors, eliminating the need for a crane to erect the house. Both exterior and interior wall surfaces were sheet steel with either Celotex or rock wool batt insulation, totalling slightly more than four inches thick. The wall construction was described as being built like a refrigerator. The entire house, except for interior furnishings and equipment, was assembled on its foundation in two hundred hours. Most of the 25,000 pounds of steel was bolted together with just a socket wrench. After the Exposition closed, General Homes became the first prefabricator to wholesale a house to a speculative builder by selling the house to developer Frank P. Ross of Oak Park, Illinois. Ross received the first Federal Housing Administration-insured loan on a prefabricated dwelling from the Prairie State Bank. The House was moved to River Forest, where it remains today. Unfortunately, one of the preservation problems facing such houses is that their uniqueness is not protected by local preservation ordinances. The house in River Forest, where Frank Lloyd Wright houses are carefully protected, was modified several years ago by adding overhanging eaves.

The company built several hundred of its modern-looking homes before the war, an output far below what could be considered mass production. Faced with public indifference to

steel houses and flat roofs, and encountering resistance from principally mortgage lenders but also building and zoning officials and the craft trades, General Houses eventually produced what the customer wanted as a means of survival. The company abandoned its primary material, steel, and characteristic modern, flat-roofed styling in favor of more commercially popular designs and materials. After intensive development work, at the end of the decade the company introduced wooden homes of conventional architectural appearance with sloping roofs, but still constructed of prefabricated panels, drawing on the research of the Forest Products Laboratory. General Houses' marketing difficulties were typical of prefabs, especially those with modern designs.

Polychrome Houses[3]

Type:	"Earley Process" Precast Concrete Panels
Developed by:	John Joseph Earley and Basil Taylor
Demonstrated:	Polychrome Houses, Silver Spring, Maryland, 1934-1935

John Joseph Earley hoped to address the housing problem by devising a system of attractive, relatively lightweight, precast concrete panels assembled on a traditional wood frame. Earley's precast panels were made from cement, graduated aggregate, and water. His standard mix was 94 pounds of Atlas white portland cement, 300 pounds of coarse aggregate, and 110 pound of fine aggregate, mixed with 5 gallons of water. The color of the coarse aggregate, revealed after the surface was brushed, determined the panel color. Once a panel was cast, excess water was drawn off by blotting the back of the casting with old newspapers. Removing the excess water made the concrete both denser and stronger. At a time when most concrete had a compressive strength of 3,000 pounds per square inch, Earley's castings routinely achieved a compressive strength of 5,000 pounds per square inch. Tensile strength was provided by welded wire mesh with a four-inch grid. Each panel was about two inches thick, thicker at the edges.

U-shaped hangers were cast into the back of each panel for lifting and anchoring the panels to the structural frame. Adjacent panels were set in place on shims and braced. Vertical reinforcing rods were threaded through the anchors at the edges. Lead foil and a rubber gasket covered the joint, then a concrete column was poured around the reinforcing bars, locking the whole system together. The foil and rubber gasket allowed for expansion and contraction while maintaining a weathertight seal. Once the concrete column had set, the shims and bracing were removed, leaving the panels hanging from the columns independent from the wood frame. Earley and Taylor were granted a patent for their technique of tying precast panels together.[4]

Earley's system did not supplant the traditional craft trades. The new technology was designed to integrate with existing construction practices. The panels were sized so that a small contractor could erect them, as Earley saw himself as a manufacturer, not a contractor. Indeed, the panels for the first experimental house were trucked to the site in pairs on the back of a small truck and set into place with an A-frame beam hoist. Earley thus did not encounter the resistance from the building trades that plagued other prefabricators whose products tended to replace craftsmen with mechanics.

Earley's system was obviously well thought out. The panels were cast in manageable sizes. Adjacent panels were designed so that there was a change in color and/or plane at each vertical joint, effectively hiding them. The result was that the house did not look like it was made of repetitive panels, a major drawback of most panel construction.

In retrospect, the Polychrome Houses were the proving ground that tested the viability of the Earley Process panels in curtain wall construction. Their walls were detailed so that the panels were suspended on the structural columns and did not rest directly on the foundation, conditions similar to what one would find in a curtain wall office building. Earley thus may have used the houses as a small-scale experiment for curtain wall construction. His proposals for the technology came true, but not in the field of housing. Precast architectural concrete became a major exterior cladding material for buildings nationwide; today's precasting industry can trace its lineage to the Polychrome Houses.

World War II Standardized Cantonment Construction

Type:	Conventional frame
Developed by:	U.S. Army Quartermaster Corps and Corps of Engineers
Demonstrated:	Military posts nationwide

The massive American build-up for World War II began in the late 1930s with the planning to mobilize men and materials for the war effort.

The mobilization construction program to house and train troops had as its hallmark speed and simplicity. The military tried various techniques and technologies to meet needs of the rapid buildup and ultimately returned to the basics: low-tech, readily available materials and standardized designs.[5] Mobilization buildings were constructed of wood from standardized plans. There were even standardized variations to provide different capacities or adapt to different climates. The buildings were mass produced. They used no exotic materials and, especially after the United States entered the war, fewer and fewer of the "critical materials" needed for war production, notably copper and zinc. Also after the war started, the construction standards were lowered. Wall framing went from 2x6s at 16 inches on center, to 2x4s at 4'-0" on center. While all of the mobilization construction was meant to be temporary, only the latter, meant for use in the theater of operations, proved to be truly temporary, barely lasting the duration of the war. The structures built earlier in the mobilization were sturdier and have lasted. They are the ones you still see on military posts today. The most ubiquitous of these was the sixty-three or seventy-four man barrack, of which thousands were built. Two stories high, 29'-6" wide by 80'-0" or 90'-0" long, its form is instantly recognizable. Within a cantonment, buildings were arranged and assembled into larger units according to standardized site plans. Each cantonment was essentially a small town, with every building type found in any community except those associated with children.

World War II Defense Housing

Type:	Various materials, including plywood panels, steel, and concrete
Developed by:	Private industry
Demonstrated:	Near defense industries nationwide

Housing for defense workers was noticeably different than cantonments, with neat, orderly rows of compact family homes. Further, the government was willing to try dramatic innovations, albeit with limited success. Primary among the innovations were prefabricated and demountable houses, for most defense housing was not expected to be needed on the same site after the war. The most famous, or notorious, of these was at a Navy propellant plant at Indian Head, Maryland. Twelve prefabricators were invited by the Public Buildings Administration to participate in a large demonstration of prefabricated and demountable housing - 650 units. Plywood panels were the most common material, although there were steel panel and steel frame designs. The project featured a site plan by Clarence Stein, but the overall effect of so many identical units with minimum standards was described as depressing.[6] Another approach to prefabrication was developed by the Tennessee Valley Authority - "sectional" construction.[7] With this design, sections of a house are constructed in truckable units to be assembled on site. Some of these TVA houses were moved as many as three times during the war as one project would end and another begin.

Washington, DC, was the site for a number of demonstrations of some of the more unusual innovations, probably to convince federal officials of the viability of the designs. Several cement-stabilized rammed earth and bitumen-reinforced adobe housing units designed by Alfred Kastner and Thomas Hibben were constructed in Alexandria, Virginia.[8] Hibben had built similar houses in Alabama in the 1930s. California architect Wallace Neff designed ten "Airform" homes, built in Falls Church, Virginia, for the Defense Homes Corporation. Startling in appearance, each Airform house consisted of two domes, constructed of concrete sprayed over an inflated balloon form, connected by a concrete block utility core.[9] Buckminster Fuller collaborated with the Butler Manufacturing Company to develop "Dymaxion Deployment Units," fully demountable, round, steel, three-room homes. The design made use of Butler's existing tooling for steel grain silos, so the development costs were minimal. One of the units was erected in a Washington, DC, trailer camp.[10]

While the federal government has, at times, aggressively promoted innovations in housing, in reality state and local governments have far more direct impact because of their authorities to regulate and control construction through building codes and zoning. Federal projects on federal land can be built without adhering to local building and zoning codes, but result in limited opportunities to transfer any innovations to the private sector. However, the major manifestation of the standardized designs and mass production techniques came in post-war suburbia.

Lustron Houses

Type:	Prefabricated porcelain enamel steel panels

Manufacturer:	Lustron Corporation, Columbus, Ohio
Engineer:	Carl Strandlund
Architects:	Roy Blass, M.H. Beckman, and Carl Koch
Demonstrated:	Approximately 2,500 constructed, concentrated in the Midwest; sixty were erected at Quantico Marine Base, Virginia

Lustron houses were completely factory-built steel panel houses that could be erected on a prepared concrete slab in three and one-half days. Based on panels used for pre-war gas stations, Strandlund designed a house because he could not get a steel allocation to resume producing gas stations. Production started in 1947; approximately 2,500 were manufactured before production ceased in 1950. A two-bedroom house cost seven thousand dollars, and consisted of three thousand pieces weighing twelve tons. Production ceased as the company was planning to market a vastly simplified, lighter model designed by Carl Koch that used only thirty-seven pieces because much more of the assembly was done at the factory.

The federal involvement with Lustron came in the form of $37.5 million dollars in loan guarantees from the Reconstruction Finance Corporation, lost when the company went bankrupt. Highly industrialized, the houses did not even attempt to integrate components with the rest of the housing industry. The most famous example was an enormous stamp press capable of turning out over 100,000 steel bathtubs a year. The plan was to sell the excess production on the open market. The only problem was that the Lustron House was designed with a 5'-1-1/2" tub, not a standard 5'-0" tub, so the company could not sell the extra tubs.[11]

The problems encountered by Lustron still haunt innovative houses. While conventional in plan and massing, Lustron houses were steel, a cold material lacking the warm and cozy feeling people associate with a house. From a real estate viewpoint, their curb appeal was less than ideal, featuring the same wall panels as the corner gas station and a roof of simulated clay tiles giving a vague Spanish aura in contrast to the stark modernity below the eaves. Building code officials and fire insurance underwriters did not know how to assess their life-safety characteristics. Zoning officials did not like them because they were perceived as a threat to adjacent property values, which often limited where they could be erected. Mortgage bankers shuddered to think of making a loan on a house that could be dismantled and trucked away and thus considered them chattel. And finally, the building trades saw a house that could be erected by five men in less than four days as a direct threat to their livelihood. When all these factors are considered, it seems inevitable that Lustron would fail.

Conclusion

The major preservation challenge of these innovative houses, particularly the ones with more esoteric technologies, is that they can present major conservation problems with little incentive to solve them. For one, proprietary materials may no longer be available. Sometimes even the formulations for a material are lost. Some materials were simply not durable. Further, because they are relatively rare, any preservation treatments developed will have only limited applicability to future work. By contrast, the mobilization buildings and their progeny in suburbia, with their simple construction and common materials, are much easier to maintain and restore, requiring less sophisticated preservation technologies and craft skills. Another preservation challenge facing innovative houses is that they are virtually unknown and frequently overlooked or ignored. Their rarity makes them especially ephemeral. Many have vanished except for historical records; those remaining are rarely protected. Yet, collectively, they reveal a fascinating aspect of American housing.

Notes

[1] "Moderate-Cost House Construction and Equipment," *Architectural Record* 76 (August 1935): 102-106.

[2] John A. Burns, "K_2H40: The Promise of Prefabrication," *Yesterday's Houses of Tomorrow* (Washington, DC: The Preservation Press, 1991), 157-167.

[3] John A. Burns, "The Polychrome House: Mosaic Concrete and the Earley Process," *Yesterday's Houses of Tomorrow*, 169-181.

[4] Frederick W. Cron, *The Man Who Made Concrete Beautiful* (Fort Collins, Colorado: Centennial Publications, 1977), 53.

[5] Diane Shaw Wasch, Perry Bush, Keith Landreth, et al., and James Glass, *World War II and the U.S. Army Mobilization Program: A History of 700 and 800 Series Cantonment Construction*, edited by Arlene Kriv (Washington, DC: Government Printing Office, 1994), 3-4.

[6] Frederick Gutheim, "Indian Head Experiment in Prefabrication." *Pencil Points* 22 (November

1941): 724.

[7] "Prefabrication: TVA 'Sectional' Houses," *Architectural Forum* (March 1944): 75.

[8] "Defense Houses at Alexandria, Va.," *Architectural Forum* 75, no. 4 (October 1941): 234.

[9] "Ballyhooed Balloon," *Architectural Forum* 75, no. 12 (December 1941): 421.

[10] "Building for Defense: 1,000 Houses at $1,200 Each," *The Architectural Forum* 74, no. 6 (June 1941): 425.

[11] Carl Koch and Andy Lewis, *At Home with Tomorrow* (New York, New York: Reinhart & Company, 1958), 112.

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Now You're Cooking with Gas!
or, From Black to White to Color in the Kitchen and Why

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The contrast between the typical kitchen workspace of the nineteenth century, with its menacing black cast-iron range fueled by coal, its wooden work tables and dark wood paneling; and the brightly enameled and tiled kitchens of the twentieth century, illustrates one of the most striking stylistic shifts in domestic interiors. That it occurred so decisively, and in rooms governed more by function than by fashion, is due to the coincidence of the gradual change in cooking stove technology from coal to gas ranges with urban expansion and rapid social change at the turn of the twentieth century. Only when these prerequisites had set the stage could interior design take a hand in the appearance of the kitchen.

The kitchen, and more particularly the cooking stove, has always played a powerful dual role as both the hub of traditional household operation and a cultural icon representing family stability and warmth. Design for the kitchen has been subordinated to and guided by whatever domestic ideal society currently favors, and we are not the first to recognize this. Writer E.C. Gardner noted in 1874 in *Homes and How to Make Them*, that "from potato-washing to architectural design the distance is great, yet there are possible steps, and easy ones too, leading from one to the other."[1]

To understand the stunning social impact of the introduction of gas technology in the kitchen, one must first appreciate the amount of sheer hard work involved in operating a cast-iron coal stove. This technology, which was common through World War I and persisted well into the middle of the century, was simple in concept. A coal (or wood) fire burned in a central firebox, surrounded by compartments designed to make use of its heat: a range top, an oven, a broiler or roaster exposed to the fire, a boiler for heating the large quantities of hot water needed for general household use, etc. This system could not differentiate the heat source for range top and oven cooking; the single fire that heated both had to burn if one wanted no more than a cup of tea. As the compartments could be arranged in a number of ways, and the stove itself was sometimes built into the kitchen wall, the general shape and appearance of the coal stove was not uniform and lent itself to a variety of fanciful treatments in accord with current fashions, reaching a decorative peak in the late nineteenth century. Ranges bore their model's names in elegant script on the oven doors, sporting personalities such as "Defiance," "Imperial," "Empress," and even "St. George" (complete with dragon). As the stoves were all made of cast iron, they were uniformly black, and were kept in that condition by the use of stove blacking on the range top. Only the occasional use of nickel-plated trim brightened the stove's appearance.[2]

The operation of a coal stove required skill, energy, and a great deal of time. The cook had to tend the fire that burned continuously throughout the day, keeping the stove hot enough to cook well but without wasting fuel. That this was no easy task is abundantly illustrated by the many books and articles providing instruction to cooks on the way to keep the stove clean, start the fire, and keep it burning through the proper use of dampers.[3] In practice, this was a hot, arduous ritual that began in the morning and lasted all day, including tending the fire as often as every ten minutes. In 1899, Boston's

School of Housekeeping estimated that the cumulative time needed to tend a stove occupied a full hour out of the day.[4] Moreover, hauling coal to the stove and ashes from it was heavy work, and many features that the late twentieth century takes for granted in a cooking stove were yet to be invented. The stoves were uninsulated, making the kitchen almost unbearably hot in the summer. They had neither thermometers nor temperature regulators, so the cook relied upon her experience and skill to judge the heat of the fire, to keep a steady temperature, and to decide when the dish was done. A cook would gauge the oven temperature by placing her hand inside and counting until she was compelled to remove it. A count of twenty, for instance, would do well for a roast.[5]

The changeover to gas technology, which began in the 1880s, was very gradual but ultimately decisive. Little natural gas was available for domestic use until the 1920s; almost all gas used before that time was "manufactured gas," created by burning coal. Even manufactured gas was only available at first in urban centers large enough to support a gas manufacturing plant.[6] Nevertheless, after World War I, periodicals such as the *Ladies Home Journal* no longer carried ads for wood and coal stoves, and by 1929 almost twice as many households used gas for cooking instead of coal or wood. In 1935, only five percent of American homes valued over $2,000 still cooked by wood or coal.[7] Electric ranges also became available for wider domestic use in the 1920s, but were not as popular as gas models, in large part because of the high cost of electricity. In 1930 *Good Housekeeping* was still printing articles such as "Your First Electric Range" long after gas was firmly established.[8] Coal stoves generally were well-built and long-lasting, which discouraged thrifty householders from switching to gas, even where the new fuel was available. Many cooks were wary of the new technology as well. Familiar with the workings of cast-iron ranges, they were not eager to discard them and learn to cook anew. They were also distrustful of some early gas models that tended to leak fumes. Gas companies such as the Maryland Meter and Manufacturing Company were obliged to mount campaigns combatting what they called "the popular fallacy that [gas] use is accompanied by great expense, and that the viands so cooked are tainted by gas."[9] For many years, the makers of Estate gas ranges stressed in all their ads that they "bake with fresh air."

The operation of a gas cooker must have seemed startlingly simple to the turn-of-the-century cook. All she had to do was light a match, hold it to the jet on the range, and turn the valve. The pilot lights on early gas ovens had to be lit before use as well.[10] It was hard for some to accept that one could cook with so little effort, and old habits of coal stove operation died hard. In 1919, the editors of *Table Talk* magazine encouraged their readers not to be afraid of relighting the gas. Apparently some cooks were inclined to leave it burning, like a coal fire, after a dish had finished cooking. "Matches," *Table Talk* reminded its readers, "are cheaper than gas."[11]

As gas range construction improved, the problem of leaking gas fumes lessened and the public was more receptive to the host of new conveniences inherent in using a gas range. The Detroit Stove Works, manufacturers of Detroit Jewel Gas Ranges, were quick to point out the cook's "relief at not having to carry in coal," as well as the simplicity of having only to "strike a match...that's about all." They said that gas made for "quick and noiseless work...when sickness comes." Finally, they told the modern woman, "grandmother's way is no longer popular."[12] These conveniences multiplied until, by the late 1920s, most of the features we are now familiar with had become standard. *Good Housekeeping* in 1920 hailed the new oven heat regulator as "a great boon to accurate cooking," noting that "it is a great comfort to be able to place the food in the oven and then forget about it until the time arrives for removing it." By 1925, the same publication noted in passing that almost all new gas ranges came with regulators.[13] At the end of the decade, manufacturers had started to insulate gas ovens to keep heat out of the kitchen.

Porcelain-enamel finishes for the new stoves were another innovation, one that had a startling visual effect as well. Since the introduction of cast-iron ranges in the mid-nineteenth century, it had been an accepted truth that stoves were black. The earliest gas stoves followed this lead. Detroit Jewel Ranges of 1903 featured casings of "blue planished steel," and the Sears, Roebuck "Advance" model of 1905 was japanned.[14] Without the need for a firebox, gas ranges were immediately smaller and more compact than their coal counterparts. Nevertheless, elaborately decorated cast-iron legs persisted on gas models until the First World War. Starting about 1910, manufacturers started to apply

porcelain enamel (generally in white or light colors) to portions of gas stoves, usually on the splashback behind the range top and on the oven and compartment doors. Its use grew through the 1920s; in 1928 *Good Housekeeping* told its readers that "much attention has been given to improving the general appearance of the range especially through the adoption of the porcelain enamel finish on all the exterior surfaces. This is very popular today." The new finish was not only attractive, but also was "easily kept as clean as a china plate."[15]

These innovations reduced work, time, and discomfort, changes that were both welcome and timely. Between World War I and the Depression, gas and electric stoves, along with the greater availability of indoor plumbing and electricity, helped change the country's domestic habits profoundly.[16] In the post-war world, fewer and fewer housewives could find or afford the maids and cooks their mothers had relied upon. Hotpoint called its gas stove of 1928 the "Phantom Maid - Let Her Do Your Cooking."[17] Many other magazine ads of the period showed nicely dressed ladies on their way out the door, smiling happily at the modern range that would take care of the dinner while they shopped, visited, or did errands. *Good Housekeeping* even declared its mission for the 1920s to be the attack, on behalf of all housekeepers, against "the everlasting problem of home management [by] shortening the longest job in the world."[18]

The middle-class housewife to whom *Good Housekeeping* addressed itself was by no means the only force in the upheavals that redefined domestic management in the early twentieth century. The rapid urbanization of the United States and the political and social movements tied to it converged in the American kitchen. This proving ground for many of the period's social theories emerged from these enterprises with a lasting new look. The population boom in America's cities, especially as a result of the waves of European immigration before and immediately after World War I, crowded cities alarmingly and affected all classes of their inhabitants. For the middle class, the enormous houses to which many had become accustomed were no longer the norm. As land became scarcer, lots grew smaller, and with them homes and kitchens. In apartment houses, slim gas stoves whose fuel did not require hauling, ash disposal or complicated smoke ventilation became a real necessity.[19]

For recent immigrants and others of the growing urban poor, apartment living became a very different way of life. In the mid-nineteenth century, the term "tenement" did not differ much in meaning from that of "apartment." Only as conditions for the urban poor worsened late in the century did the word take on a pejorative meaning. The kitchens in these homes shrank in successive redesigns to squeeze ever more tenants into less space.[20] The crowding, poverty and lack of education in the tenements fed poor sanitation and disease until other city dwellers could no longer ignore their growth.

The beginnings of a serious struggle against these legacies of the Industrial Revolution first took root in the 1920s and 1930s. Reformers quickly identified poor housing, especially poor sanitation, as the crux of the problems. Some of the most thoughtful and successful of these efforts were the settlement houses where reformers lived among the poor, the better to understand their struggles and teach them what they needed to survive and prosper in America. Hull House, founded by Jane Addams and Ellen Gates Starr in Chicago in 1889, was the first of these; another was the Henry Street Settlement on the Lower East Side of New York, started by Lillian Wald, a nurse, in 1893. Addams sought to study the problems of the modern city with "scientific accuracy," and this determinedly unromantic approach was to characterize the attitude of thinking people toward domestic issues through the mid-1920s.[21] This scientific approach had a strong educational aspect; the visiting nurses of the Henry Street Settlement entered tenement homes as much to teach good sanitary practices as to heal.

The kitchen became a focus for reformers' efforts. It was both the hub of domestic activity and, even in the late 1930s, often the only place where tenement families could control their sanitary environment, as bathrooms were shared by many families on a common hall. Appropriately, one of the first public housing projects in America that sought to remedy these conditions was named after Miss Addams. The Jane Addams Homes, completed in 1937 under the auspices of the Public Works Administration, were "of modern construction, fireproof and sanitary, with hot and cold running water, central heating, bath facilities and gas stoves and electric refrigerators in the kitchens."[22]

Only a relatively small number of women were actively involved in urban reform. A much

larger number, especially in the middle class, sought to redefine for the twentieth century domestic activity and their role in it in the wake of technological and social changes that had given them more free time but failed to indicate how they were to fill it. These women dealt with many issues in common with the urban reformers, including the importance of sanitation and a scientific approach to things domestic. They created from these ingredients the new field of "domestic science," whose focus was the kitchen and that sought to create a professional, scientific setting for their own occupations.

Domestic science was not a wholly new idea. As early as 1869, Catharine E. Beecher and her sister, Harriet Beecher Stowe, had written an influential book, *The American Woman's Home,* in which they promoted the value of rational, efficient housekeeping. They felt that:

> Every woman should be taught the scientific principles in regard to heat, and then their application to practical purposes, for her own benefit, and also to enable her to train her children and servants in this important duty of home life on which health and comfort so much depend.[23]

This approach took on new life at the turn of the twentieth century as women felt greater urgency to professionalize their traditional roles. The American Home Economics Association was formed in 1899, giving a new name to the field. It sought to insert the study of domestic topics into college curricula; by 1914, 250 schools offered home economics courses, 28 schools offered a Bachelor of Arts in the subject, and 20 made postgraduate work available. The University of Chicago offered a Ph.D. in the new field. Although these curricula frequently contained watered-down, home-oriented versions of standard academic subjects, such as chemistry, they were seen as major opportunities for serious-minded women.[24]

Most women were willing, even eager, to accept this role in academia and in their work, since, even in its new incarnation, domestic science saw its ultimate aim much as Catharine Beecher had: "The proper education of a man decides the welfare of an individual; but educate a woman, and the interests of a whole family are secured."[25] Cooking and cleaning were to be neither simple chores nor pleasures, but rather professional responsibilities with heavy moral weight. Jane Addams remembered this period as one when the Women's Clubs associated with Hull House, spurred initially by a "quest for culture," turned instead to an "interest in child labor, home economics and public health, housing and social hygiene."[26]

While Addams and others saw that "women could not fulfill the two functions of profession and home-making until modern inventions had made a new type of housekeeping practicable," others were simply glad to take advantage of the new labor-saving technology: "Would you go back to the back-breaking, nerve-wrecking, soul-destroying ways of your grandmothers?" demanded one writer.[27] Many women's concerns stayed close to home. Women's magazines of the period were filled with articles and advertisements about overworked women left so bad-tempered by domestic chores and crises that their marriages were in danger. An advertisement for kitchen cabinets in 1923 warns that "the bride who starts with old, out-of-date methods that make work hard and hours long, will probably leave her charm in the kitchen."[28]

After the original surge of interest at the turn of the century, domestic science took a back seat to events overseas during World War I. After the war, the subject reemerged vigorously. *Table Talk* magazine told its readers in 1919 that "household engineering" should be their focus now that the urgencies of war were over. The editors advised that up-to-date equipment for the kitchen was a necessary investment, not a luxury. Architectural pattern books, domestic science texts, and women's magazines reiterated the point that the kitchen was the most important room in the modern house. Time-saving equipment was for many a real necessity because in the 1920s, all but the wealthiest families abandoned hopes of having cooks and maids.[29]

The kitchen was recast as a severely technical place requiring the latest equipment. "Father insists on having - and has - the very latest tools and implements for his office or on the farm, and why should not mother have the newest devices in her kitchen?" asked *Table Talk* of its readers. The smaller kitchens of the 1920s were viewed "more than ever [as] workshops for meal-making only."[30] In a kitchen outfitted like a hospital or laboratory, the lady of the house metamorphosed from cook to technician.

Sanitation remained a preoccupation, to be achieved by proper housekeeping habits, especially in the kitchen; it was there that one hunted the germs that threatened the grail of a truly clean and sanitary home. The kitchen

should be "clean with the scientific cleanliness of a surgery, which we all know to be far ahead of any mere housewifely neatness."[31] Manufacturers played upon this obsession: a Lysol disinfectant ad of 1923 inquired of the insecure, "What is your degree of Cleanliness?" To satisfy this new imperative, kitchen furnishings and appliances were increasingly designed both to make cleaning easy and to advertise their cleanliness through the color white.[32]

Magazines were filled with ads and articles emphasizing "how difficult it is to keep your kitchen...clean without modern appliances and plenty of them."[33] In an article entitled "Modern Appliances in House-Cleaning," a housewife in 1917 described her cleaning routine in the kitchen mainly in terms of the materials and colors of its contents: white oilcloth, white enamel, and shellac figure prominently. A few years later, an ad for Kitchen Maid cabinets boasted that, "with every inside corner rounded and all surfaces smooth, without panels, the Kitchen Maid actually eliminates dust-catching corners." Later in the 1920s, another advertiser mused:

> How fortunate we are to live in the Era of Enameled Ware....We, who are accustomed to the clean, enameled bath tub, rebel at the thought of submitting to the hazards of any other kind....Surely we should be as greatly concerned about the cleanliness of the foods that enter our bodies....The smooth, white surface [of Vollrath Ware] is non-porous...[it] has no seams, crevices, rivet heads or inaccessible places where dirt can lodge and resist cleaning.[34]

At first, the resulting contrast with traditional kitchen furnishings was noted mostly in practical terms. In a 1920 article describing a model kitchen complete with "glossy white enamel paint" on walls, the writer notes that the white paint would only "make for undue work...where coal and the attending ashes have to be reckoned with," in which case buff or yellow would be more appropriate. In the same year, the maker of Porce-Namel tables told potential customers that "Progressive housewives are discarding their old wooden tables," in favor of ones that were "snow-white enamel inside and out...[which] *furnishes* the kitchen."[35] Smooth surfaces and sleek detailing were introduced for practical and unsentimentally rational reasons:

> Carving on furniture, elaborate castings on stoves, decorated metal fixtures, fancy shaped handles on dishes etc., are things which make cleaning unnecessarily difficult....It is difficult to see why garlands of leaves and flowers or bronze dogs should ever be considered appropriate decoration for stoves....[New stoves] can more easily be kept clean [and] are more in accord with the requirements of good taste than those which are awkward in shape or laden with useless ornaments.[36]

Making the kitchen white was an obvious way to update it: "Picture your home refinished in pure white...immaculate, sun-flooded and inviting....[Luxeberry Enamel] has not the slightest trace of blue, gray or yellow."[37] Gas ranges, which at first sported white enamel oven doors, were often by the end of the decade completely covered in white porcelain enamel. The color white was so dominant in the domestic arena that even white foods were especially popular; recipes called for white sauce to cover almost every imaginable dish.[38]

By the mid-1920s, the emphasis on light colors and smooth surfaces as "the sign of visible sanitary awareness" had evolved into an aesthetic of modernity. An ad for Leonard Cleanable Refrigerators told readers that "Gleaming white kitchens mark the new era of cheery homes, better living, brighter days for women." A gas range manufacturer called on women to "observe the trim, distinctive straight line front, the exclusive absence of unsightly pipes or projections, the flush paneled doors, the rounded edges and corners. Beauty! Simplicity!"[39] While kitchen designers and manufacturers in the 1920s clearly viewed the old-fashioned, dark kitchen as outmoded, they still did not yet view the kitchen as the subject of decorative fashion, but rather as an important functional area. A decorating article on "The Principles of Color" in 1923 discussed every room of the house except the kitchen. One writer even argued specifically that the kitchen should be "differentiated from the other rooms in color scheme and general atmosphere, for it is made different by its work."[40]

These discussions of the kitchen's appearance were taking place while Elsie de Wolfe was revolutionizing the rest of the house. De Wolfe, who invented interior decoration as a profession, had startled early twentieth-century America with her designs. She removed dark woodwork and patterned wallpapers, replacing them with "clear surfaces" of ivory, cream or pale gray painted walls, eighteenth-century French antique furniture and "up-to-the-minute convenience." She had a brief enthusiasm for stark black and white as an exclusive color

combination, inspiring a Cole Porter tune in the revue "Kitchy Koo of 1919" called "That Black and White Baby of Mine." Although she created what her biographer calls "a curiously dainty form of functionalism," she studiously avoided the kitchen, presumably viewing it as a little too functional; she decorated the homes of the wealthy, who rarely frequented the kitchen.[41] The influence of de Wolfe and her many imitators was profound, and created a climate where the popular press could extend her ideas even to the kitchen. By the late 1920s, even that room was a venue for fashion and design.

When the enthusiasm for pure white had exhausted itself after the mid-1920s, design for the kitchen increasingly incorporated colors. Rather than emphasizing sanitary needs, which by then were a generally accepted basic requirement for kitchen furnishings, cheerful colors came into style. There had been a few touches of color through the 1920s; appliance manufacturers, seeking to provide variety, offered touches of soft colors, as did designers growing tired of monotonous white. In 1926, *Good Housekeeping* offered a model kitchen whose buff walls and green-and-tan checked linoleum made "a decorative background for these very practical workshops."[42]

Suddenly, in 1928, practicality was dismissed as the same magazine announced:

> A wand of color has passed over the whole house and has even penetrated to the kitchen!...[D]evices and equipment [are] no longer in the conventional white, but in gay reds and yellows and greens....Kitchens once all in white or in dull drab shades may now be made bright and cheery by the introduction of color.[43]

Almost instantaneously, manufacturers showcased the variety of their new designs in the color magazine ads that were becoming more and more common. Lowe Brothers paints heralded "a gorgeous wave" of color "on pots and pans, on furniture and floors....Your kitchen has become a brighter, pleasanter, more cheerful place to work in."[44] The theme of cheerfulness had by then almost entirely overwhelmed the serious-minded focus on utility that had characterized talk of the kitchen only a few years earlier.

No longer was the kitchen the workshop of the home, where only the quasi-professional technician had business. An advertisement for Hoosier cabinets in 1928 declared that "a delightful intimacy has taken the place of the cold, stiff-back society of a few years ago....Nine times out of ten, before the evening is over your guests have been out in your kitchen. Is it modern and up-to-date - full of color and cheer and convenience?"[45] Almost overnight, appearance and social pressure had replaced stern duty in guiding kitchen design. By 1930, an ad for Magic Chef stoves featured a model with a yellow body and black oven doors, which they described as "a definite departure from traditional cooking appliances....[It] has the endorsement of famous engineering experts and of leading authorities on art, decoration, and design."[46] By the beginning of the Depression, technology and fashion had finally found an accommodating partnership in the kitchen.

The evolution of the kitchen's purpose and appearance continues to this day and beyond. The color and social warmth of the 1930s ushered in a renewed emphasis on the kitchen as the embodiment of the family hearth, and high-tech gadgets absorbed attention in the 1950s. A few unfortunates are still living with "harvest gold" and "avocado green" appliances from the 1970s. Today, electronic appliances have taken center stage, as evidenced by the mushrooming number of electrical outlets on the standard kitchen counter. Microwave ovens and the stylish prepared meals they cook have dramatically decreased cooking time. Espresso machines, bread makers, and even automatic rice cookers are emblematic of the kitchen as recreational center today. Serious cooks are either professionals or creative hobbyists. The interplay of technology and society in the kitchen will continue to provide us with food for thought.

Notes

[1] E.C. Gardner, *Homes, and How to Make Them* (Boston, Massachusetts: 1874), 208.

[2] Lillian Baker Carlisle, "The Cookstove: Liberator of 19th Century Women," *The Antiques Journal* (August 1980), 53; Faye E. Dudden, *Serving Women: Household Service in Nineteenth-Century America* (Middletown, Connecticut: Wesleyan University Press, 1983), 131; Sears, Roebuck and Company, "Book of Stoves," second edition (Chicago, Illinois: 1905), 632.

[3] Maria Parloa, *Miss Parloa's Kitchen Companion* (Boston, Massachusetts: 1887), 62.

[4] David M. Katzman, *Seven Days a Week: Women and Domestic Service in Industrializing America* (New York, New York: Oxford University Press, 1978), 128.

[5] Parloa, 63-64; Gwendolyn Wright, *Moral-*

ism and the Model Home (Chicago, Illinois: University of Chicago Press, 1980), 36; Susan Strasser, *Never Done: A History of American Housework* (New York, New York: Pantheon Books, 1982), 41; Dudden, 13.

[6] Maryland Meter and Manufacturing Company, *Perfect Gas Ranges* (Baltimore, Maryland: 1896), 1.

[7] Lawrence Wright, *Home Fires Burning: The History of Domestic Heating and Cooking* (London: Routledge & Kegan Paul, 1964), 167; Ruth Schwartz Cowan, "The 'Industrial Revolution' in the Home: Household Technology and Social Change in the 20th Century," *Technology and Culture* 17 (January 1976): 7.

[8] "Your First Electric Range," *Good Housekeeping* (April 1930): 96-97.

[9] Maryland Meter and Manufacturing Company, 3-4.

[10] Ibid., 5.

[11] "Save Fuel When You Cook," *Table Talk* (May 1919), 30.

[12] Detroit Stove Works, "Detroit Jewel Gas Ranges," Catalog No. 74 (Detroit, Michigan: 1903), 123-25.

[13] "Fuels that Leave the Kitchen Cool," *Good Housekeeping* (July 1920): 67; (April 1925): 84.

[14] Detroit Stove Works, 5; Sears, 675.

[15] *Good Housekeeping* (January 1928): 80.

[16] Laura Shapiro, *Perfection Salad: Women and Cooking at the Turn of the Century* (New York, New York: Farrar, Straus and Giroux, 1986), 222.

[17] *Good Housekeeping* (February 1928): 114.

[18] *Good Housekeeping* (February 1923): 8.

[19] Dudden, 132.

[20] Gwendolyn Wright, *Building the Dream: A Social History of Housing in America* (Cambridge, Massachusetts: MIT Press, 1983), 119, 124.

[21] Allen F. Davis and Mary Lynn McCree, editors, *Eighty Years at Hull-House* (Chicago, Illinois: Quadrangle Books, 1969), 6.

[22] Davis and McCree, 226.

[23] Catharine E. Beecher and Harriet Beecher Stowe, *The American Woman's Home* (New York, New York: 1869), 66.

[24] Shapiro, 185, 219.

[25] Ibid, 29.

[26] Jane Addams, *The Second Twenty Years at Hull-House* (New York, New York: The Macmillan Company, 1930), 95.

[27] Ibid., 196; Paul Pierce, "When Clean Food is Really Clean," *Table Talk* (October 1916): 22-23.

[28] *Good Housekeeping* (May 1923): 131.

[29] Isobel Brands, "The Business of Home Making," *Table Talk* (August 1919) 11-14; Gwendolyn Wright, *Moralism and the Model Home*, 239; Cowan, 10-12.

[30] Reba Anderson Johnson, "The Attractive Kitchen," *Table Talk* (December 1919): 54-55; "Planning for Saving Work," *Good Housekeeping* (January 1925): 70-71.

[31] Isabel McDougall, "An Ideal Kitchen," *House Beautiful* (December 1902): 27.

[32] *Good Housekeeping* (January 1923): 137.

[33] Pierce, 22-23.

[34] Mary McCrae Cutler, "Housecleaning Day by Day," *Table Talk* (February 1917): 48-49; *Good Housekeeping* (October 1920): 132; (January 1923): 128.

[35] "When Every Kitchen is Model - An Aid to Replanning," *Good Housekeeping* (March 1920): 38; (June 1920): 176.

[36] Helen Atwood, "Efficiency and Equipment," *Table Talk* (October 1918): 33-36.

[37] *Good Housekeeping* (April 1924): 256.

[38] Shapiro, 91-94.

[39] *Good Housekeeping* (May 1924): 136; (April 1923): 251.

[40] "The Principles of Color," *Good Housekeeping* (February 1923): 42; Helen Binkerd Young, "The Home Kitchen," *Table Talk* (February 1917): 22-28.

[41] Jane S. Smith, *Elsie de Wolfe: A Life in the High Style* (New York, New York: Atheneum, 1982), xvi, xvii, 63, 109, 138, 203.

[42] *Good Housekeeping* (February 1926): 78-79.

[43] "Now You Can Get It In Color," *Good Housekeeping* (February 1928): 87.

[44] *Good Housekeeping* (June 1929): 217.

[45] *Good Housekeeping* (May 1928): 332.

[46] *Good Housekeeping* (March 1930): 229.

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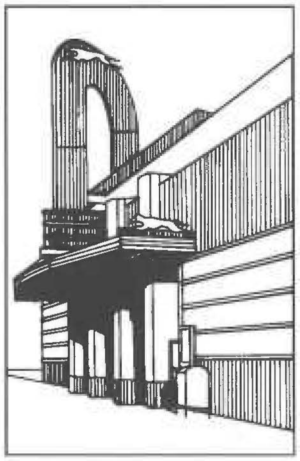
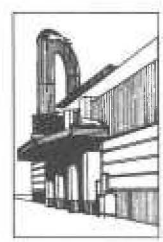


Post-War Housing



The Houses of Levittown in the Context of Postwar American Culture

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World War II entered history with almost unanimous agreement among Americans that it was if not the *only* good war, then it was certainly the last of them. Coincidentally, it was also the war in which the majority of the veterans were given economic and social benefits on their return from action.[1] These facts are not unrelated. The treatment of the veteran, particularly in the area of homeownership, secured the loyalty of the working class in the years of demobilization and retained it through most of the decades that followed.

The most significant and widely noted benefit of World War II, the Serviceman's Readjustment Act, or GI Bill, took effect in 1944. Two major provisions of the Bill provided access to housing and education.[2] Through the institutionalization of a formerly radical approach to the politics of housing in America - government underwriting of mortgages for Americans who had no capital - the GI Bill set in motion a dramatic transition in American society. The houses the Bill funded reinforced the nuclear family, not only through economic incentives but also through the very design of the housing it promoted. As a result, the years immediately following World War II were years in which the working class of America, at least those who had served in the military, experienced an upsurge not only in the level of their expectations, but in the realization of those expectations. By expanding the home-owning class, the postwar housing policies served to preserve the established order in what might have been a period of risk.

For the past half-century, the entry-level housing that resulted from the GI Bill has been viewed by most Americans as the opening salvo in the suburban revolution in which government policy enabled the working class of America to become members of the home-owning - or middle - class. This process has received mixed reviews: critics on the left have lamented what they view as an erosion of the class consciousness of American labor, while those with a conservative view have applauded the expansion of the middle class as a natural outcome of American capitalism. In either case, however, the housing innovation of the postwar period — the privately owned, single-family dwelling, financed by banks whose risk was underwritten by the federal government — has become the accepted norm for working Americans.

The domestic architecture of the houses funded by the GI Bill is typified by the four-room "Cape Cod" cottages built at Levittown on Long Island, New York. The houses were small, four to four-and-a-half rooms, and generally followed the traditional form of two bays across the front and two across the back with a bathroom inserted behind the kitchen to economize on plumbing. Their design encoded the American belief system in their topography, and reinforced - if not imposed - its concomitant way of life through their geography. The houses provide a document that reveals the power of the postwar housing policies to generate a major social transformation and merit the attention of those who would preserve the recent past.

The 1950 Census reflected the efforts of legislators, builders, and bankers, as the population of the suburbs exceeded that of both urban and rural areas. In addition to resolving the housing shortage, the GI Bill turned millions of urban-dwelling tenants into suburban-dwelling

homeowners. By making a house and land accessible to lower-income Americans, the postwar housing policies increased the numbers of those who, according to traditional Republican theory, could be expected to have a stake in society, and by extension, to uphold its institutions. By returning Rosie the Riveter to the kitchen and GI Joe to the front yard, the houses served to domesticate the American workers. Moreover, by making the "American Home" - the quintessential symbol of the American dream - available to people whose prewar economic level would have precluded home-ownership, these policies resulted in a wider diffusion of American middle-class values. The symbolic relationship between private property and membership in the middle class was reversed; what had once been necessary now became sufficient. Home ownership no longer signified middle-class status, it conferred it. The provision of so many middle-class benefits to the working class reduced the potential for disruption and secured the loyalty of the American worker for decades to come.

By the end of the 1940s, the American labor movement had lost the militancy it had exhibited in the 1930s. The workers had become consumers - haves, rather than have-nots - with houses, cars, appliances, and even money in the bank.[3] In effect, the affluence of the postwar years had reduced the class-consciousness of the worker, undermined the unions, and expanded the middle class. This was not an unanticipated outcome. As the war came to a close, business and political leaders had been concerned with the need to foster a smooth transition to a peacetime economy. Underlying their concern was the possibility of a postwar American version of the Socialist revolutions that had plagued so much of Europe after World War I. Widespread resentment on the part of the veterans could result in major social upheaval. The "boys" might be led to consider themselves short-changed in the postwar conversion economy and seek solutions outside the system.

This fear was expressed by the national commander of the American Veterans of World War II, Jack Hardy, who urged government action, warning, "It is likely that a desperation born of unmerited privation, inexcusable in this country, may create an acute and dangerous rift between veterans and the political management that makes such conditions possible."[4] Left unresolved, these issues could produce a genuine threat to the peace; a threat that had to be addressed. It was generally agreed that low-cost housing was among the most pressing of their needs. How that housing was to be provided was still under debate.

Although the housing constructed for defense workers and military families during the war had set a precedent for direct federal involvement in residential construction, there was strong ideological opposition to direct federal aid to the individual, even homeless veterans. Advocates on both sides of the housing issue advanced their particular position under a banner of patriotism: direct federal aid to the individual was tantamount to overthrowing the social and economic system; not to provide housing for those who had fought to preserve the American Way was tantamount to treason.

When the debate was over, the direction of the housing programs was clear. Veterans' housing, regulated by the Federal Housing Authority (FHA) and funded through the Veterans' Administration, would be built in the traditional form of the American dream: a vine-covered cottage set on a small plot in a suburban setting.[5]

Throughout the war, the home, the symbol of the dream, had been a stock pictorial element in public service advertising.[6] By late 1943, images of uniformed sons in cozy kitchens with aproned mothers and steaming pots suggested that reconversion was just a matter of time.

An ad for the Lee Rubber and Tire Company in 1943 presented the "typical" family of the era: father, mother, and two children facing a small white Cape Cod house.[7] Above the house floated a school, a church, and a factory with the title, "THESE ARE FUNDAMENTAL." The text outlined the position of the company on American labor:

> Homes and families; practical efficient schools; a church leadership that makes devotion to religion a spiritual inspiration; elimination of class hatred and resumption of confidence and mutual interest in each other; employment for all who want it and independence for everyone who will work for it: *these are fundamental* for normal and continued prosperity.
>
> Helicopters, ultra-streamlined motor cars, household conveniences akin to magic.. may be highly desirable...many of them are doubtless attainable...but the pursuit of that happiness which is guaranteed to every citizen by our constitution resets on simpler, more fundamental things.

> Republic Rubber and LEE of Conshohocken Tires are conscious of these fundamentals. At Youngstown [Ohio] and Conshohocken [Pennsylvania] our objectives have already been plotted...objectives in the direct line of march toward a happier, a greater and a permanently prosperous America.[8]

The subliminal message in the ad was clear: America is not like Europe; here, the workers are part of the dream, and the dream is attainable by all, without political upheaval.

A major result of the housing policy discussions was to intensify the ideological link between the privately owned single-family house in the suburbs and the fulfillment of the American dream; between the nuclear family and the social order. America was looking ahead to the future, and the home would be an integral ingredient of the "happier, greater, permanently prosperous" America to which it looked. Included in the formula were the school, the church, and the factory. These "simpler, fundamental things" at least, were promised to the working American. He, in his turn, need only promise his continued fealty to the American system. The appeal of the privately owned single-family house grew even stronger in the closing months of the war.

The social concern with the unmarried young man as a potential source of disruption is as old as industrialization and the rise of wage laborers.[9] Newly constructed as "masterless" men, the unaffiliated male workers of the early modern period were viewed as threats to society. Nineteenth-century reformers cast the home and family as substitutes for the stabilizing influence of the master. By the twentieth century, this concern had solidified around the threat of a growing labor movement. Just before the Depression, Herbert Hoover called for a movement to increase the percentage of homeowners because:

> ...the present large proportion of families that own their own homes is both the foundation of a sound economic and social system and a guarantee that our society will continue to develop rationally as changing conditions demand.[10]

The link between Americanism and home owning took on greater force in the 1930s as the deepening depression increased worker dissatisfaction with the economy. A number of housing advocates in that period articulated the position that homeownership - as opposed to good housing - was also a protection against the various forms of collective activities that were being advocated not only by unions, but by radical political reformers.

Socialists and communists had made major inroads into the labor movement in the 1930s, and they were perceived as one of the major threats to the established order. Proponents of housing used this threat in advocating the expansion of proprietary housing.

> Ownership of homes is the best guarantee against communism and socialism and the various bad "isms" of life. I do not say that it is an infallible guarantee, but I do say that owners of homes usually are more interested in the safeguarding of our national history than are renters and tenants.[11]

> Socialism and communism do not take root in the ranks of those who have their feet firmly embedded in the soil of America through home ownership.[12]

Franklin Roosevelt rephrased the sentiment in the middle of World War II when he declared that, "...a nation of home-owners, of people who own a real share in their own land is unconquerable."[13]

By 1945, home-owning, even for those with little capital, had become the ideal for working Americans. The twentieth-century version echoed a century of Jeffersonian philosophy in equating home-ownership with a strong social order: housing in general, and home ownership in particular, were the cure or prevention of a variety of social ills.[14]

In the years after the war, the nuclear family was advocated as the ideal state, particularly for the young in the working class, and a subtle pressure to marry and settle down made its appearance in the popular culture. Nat King Cole's hit song, "Too Young," told the story of teenage lovers who were in fact not too young for marriage. Films such as "Every Girl Should Be Married" urged young men to tame the working woman and return her to domestic bliss. However, marriage alone did not suffice; the proper setting was also critical. In the 1940s and 1950s, that setting was the single-family Cape Cod style cottage in the suburbs. Ads for everything from car wax to tools and paint featured young couples with one or two small children in tow, happily posed in front of a small Cape Cod in a suburban setting. Basal readers discovered the Cape Cod, replacing the urban/rural dichotomy of the 1930s with the suburban icon.

The relationship between home-owning and good citizenship was expressed in the popular culture as well. In Frank Capra's 1946 film, *It's a Wonderful Life*, George Bailey's father assured America, as well as the villainous Mr. Potter, that home owning was an essential part of the American way of life and that the denial of that basic right to the workers of Bedford Falls would lead to political as well as social tragedy.[15]

Domesticity in a small house was promoted at the political level as well. While the thrust of their rhetoric celebrated the housing policies as the fulfillment of the dream, the language of the policy makers of the 1940s reiterated their confidence in domesticity as a form of social control.[16] The postwar expansion of policies promoting homeownership was presented as a form of insurance against the political subversion of those who were less likely to be committed to the Republican ideology, and by extension, more susceptible to subversive rhetoric - young men who owned no property. In 1945, William Levitt, the builder of Levittown, argued in support of government involvement in the production of low-cost private houses with the promise that "no man who owns a house and lot can be a Communist, he has too much to do."[17]

These samplings of the public stance on homeownership suggest that the housing programs were intended as much to defuse the potential for political subversion as to house the veterans and that there was as much a political as an economic agenda in the decision to provide the veterans with low-cost housing. In both cases, it was successful. The postwar housing experience is, therefore, a lesson in process; in its attempts to smooth the transition to a peacetime economy, the United States government created a means by which the worker could realize the basic elements of the American dream and in so doing, assume the values and mores so long associated with it.

Government specifications on the houses and floor plans of the FHA were based on traditional middle-class housing forms. It was not the three-room tenement, nor the two-bay dog-trot, nor the one-room log cabin, which were the traditional forms of housing for the working classes. Rather, the Cape Cod of the postwar era was a reduction of the suburban villa to an affordable minimum; its four rooms and bath allowed for the essentials of middle-class life, while its reduced size and scale remained within the financial reach of the worker. It was suited to both its time and its function. In the intervening decades, it has become as much of an icon as the earlier forms of worker housing. Nevertheless, it is important to note that its design was a conscious choice at the time by those who created the policies that funded their construction.

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The physical arrangement of domestic space begins as a tacit statement of the values and lifestyles of those for whom it was designed and built. When an architect designs a house for a client, there is an interrelationship between the needs and desires of the residents and the various elements of the floor plan. When houses are constructed for a mass market, the structural elements are tailored instead to the needs and desires of a "typical" - or composite - client as they are interpreted by the deliverers: the architect, the builder, and the lending agencies that fund the construction. Thus, as with the other house forms mentioned above, the houses of the postwar period were intended to function in a particular way.

When the state intervenes in the funding of residential architecture, the government becomes both client and architect. It is therefore important to examine the products of that intervention as well as the cultural values imposed on the residents by the design.

For over a decade, the FHA produced planning bulletins that "suggested" not only construction standards but design and environmental standards as well. In addition, ceilings were placed on the cost of the dwellings that could be produced, thus locking the construction programs into the market of those earning between fifty and sixty dollars per week.[18] As a result, the houses funded by the FHA and the GI Bill were almost exclusively low-cost single-family dwellings in suburban settings. Most had no more than four to five rooms and were marketed to young male veterans in the second economic quintile.

From October of 1947 until the Spring of 1949, the Cape Cod was the only house offered at Levittown on Long Island. Modeled after the recommended patterns of the FHA, the houses were deliverer-designed, traditional in structure and style, and imposed upon a population of young workers desperately needing housing.[19] Their design fostered and reinforced the dominant values of the American middle class, and,

despite the traditional association of women and children with house and home, they were marketed primarily to men.

The houses themselves were interchangeable; the interiors, exactly the same. This distinction between identical interiors and variations in exterior design reflects an important difference between the social orientations of men and women toward their houses in the 1940s. For men the house was primarily a place to which to come, whereas for women it was a place in which to be. This difference is directly related to the cultural gender roles vis-a-vis the home; men left it to go to work, women worked within it. Men returned to the house to get away from their work, women left the house to get away from theirs. Men were the house-providers; how well they provided was largely determined by the size, construction, and aesthetic ornamentation of the dwelling.

Men judged houses by these external standards, the public image of the house, and in turn they were judged by these aspects of their homes. Women, on the other hand, were the homemakers. They were judged by the interior aspects of their houses: its cleanliness and its decorative appeal.

This distinction between gender-related design perspectives is readily apparent in contemporary architectural commentary on the Levittown construction. In the trade journals, there were repeated references to Levitt's "five models" and to the variety of exterior colors and window arrangements. Little notice was taken in either the Levitt-generated articles or those written by architectural and housing critics of the fact that the interiors, as delivered, were literally interchangeable: the floor tile in every house, through 1951, was black asphalt "Kentile"; the cabinets and appliances, white enameled steel. Even the candle motif in the stair-rail and over the kitchen cabinets was unvaried from one house to the other. Yet, even within the mass-produced organization of Levittown, some variation in interior scheme could have been achieved, at less cost than the exterior variations the firm provided. The mere rotation of the house-plan on its axis would have offered some variation in interior space. None was provided; the emphasis was entirely on the external appearances.

The design variations were far more concerned with differences in facade design, site orientation, and landscaping as marketing strategies than with differences in room design, floor plan, and the articulation of interior space. This was not an accidental aspect of the housing programs. These houses, after all, were built for "*Mr.* Kilroy."

In contrast, the community facilities provided by the builder were focused on the assumed needs of women and children; "village greens" provided shopping areas with playgrounds, pools, and - later - schools. These facilities, predicated on the recommendations of the FHA, were oriented toward the needs of a nuclear family.[20] By shaping the available recreation, they served to limit large-group activities in Levittown to those that were essentially domestic, that is, child- and family-centered.

There were few of the traditional male meeting places in early Levittown, and the weekend activities of home-maintenance limited the free time of the young residents - particularly during the early years when Levitt could dictate the tasks.[21] The individualization of the dwellings served to keep the nuclear unit intact, while limiting the opportunity for collective activity among the young men.

This emphasis on the nuclear family had been atypical among young families of both the lower-middle and working classes in the years preceding the war, among whom it was more common for the men to gather in male-oriented locations such as bars, firehouses, gas stations, or ball fields.[22] In its early years, Levittown lacked these staples of male bonding, and no provision was made for them either by the developer or in the suggestions of the FHA.

Instead, the environment imposed a value that was gaining popularity among the social experts of the popular press as "togetherness."[23] Variously defined by such slogans as "the family that prays together, stays together," or "the family that plays together stays together," the emphasis in the 1940s and 1950s was on the family, domesticity, and the single-family dwelling.

For Levittowners in the early years, togetherness was inherent in their houses. Combined with the lack of external gathering places for the men, the size of the house all but forced the young couple to spend most of their recreational time together. The design of the house contained the essentials of suburban living. The footprint of the house was 750 square feet, in which were a 12 foot by 16 foot living room, two bedrooms (12 feet by 12 feet and eight feet by ten feet) and a small

kitchen (ten feet by ten feet). The unfinished attic provided the potential for two additional rooms.

Despite the reduction in its interior space, each house was set on a minimum of six thousand square feet of land; fifty percent more than the four thousand square foot minimum required by the building code.[24] The apparent contradiction in adding an extra two thousand square feet of land while omitting non-essential elements in the house is related to the intrinsic value of the Arcadian setting in American ideology. The lawn and garden represent a twentieth-century version of male domesticity, which is rooted in the nineteenth-century myth of the yeoman farmer.

Levitt reinforced this aspect of the myth by landscaping the plots and including four fruit trees as part of the landscape for each house, and then including in the tenants' agreement the obligation to maintain the landscape.[25] Unlike the cliff-dwelling Ralph Kramden, who was free to spend his evenings at the lodge with his brothers, the young men of Levittown had lawns to mow, bushes to trim, and furniture to refinish.[26]

The size of the houses encouraged a second form of male domesticity. This was the promotion of household production. Due in part to the shortage of labor induced by the postwar building boom, manufacturers had instituted a marketing strategy to move such materials as paint, flooring, plumbing fixtures, and appliances that encouraged the homeowner to "do it yourself!" Magazines supported their advertisers with articles telling their readers "how-to" and suggesting additional projects for them to do, "together." The original size of the Levittown houses virtually demanded that they be enlarged in order to correspond to the customary middle class homes of the period. In addition, the combination of larger plots and smaller houses served as a spur to the construction of ells and outbuildings as the young families outgrew the basic house.[27] Moreover, the standardized products that had enabled Levitt to mass-produce the houses at Levittown also enabled a handy young man to take on the job of remodeling the house without too much training.

Although the basic Levitt Cape Cod was a clear invitation to home remodeling through addition, no practical space was provided in which to do the work. There was no ancillary space - no garage, no basement, no shed - to provide the workshop for the household. The unfinished attic, which could have served, and indeed, in many cases *did* serve, in this capacity, was not fit for such use in its original state, having no flooring other than a service catwalk.[28] Thus, there was little opportunity for it to become a male workshop or refuge.

Rather than supporting "do-it-yourself" as a form of recreation, the Levittown Cape Cod, through its lack of amenities, virtually demanded it. Similarly, the lack of separate male space in both the houses and the community reinforced the emphasis on togetherness. There was simply no place else to go.

Despite the limitations, the men of Levittown rebuilt the houses, adding dormers, wings, and garages. They created lush lawns with abundant shrubbery, and they took to their domestic life with great fervor. Today, the residents of Levittown are good, solid, patriotic Americans who ask little more from their government than that it leave them alone. They see themselves as middle class, despite their many years on the assembly line at defense plants such as Republic and Grumman or working as postal workers, truck drivers, police or firemen. They are not on the dole; they do not seek or accept welfare. Indeed, they disdain those who do.

Yet, fifty years ago, they were the beneficiaries of a massive program of government intervention and subsidy. With no cash investment, they walked into houses that the government had regulated, designed, and underwritten. Through the policies of the FHA and the GI Bill, the United States government had not only guaranteed that the lender and the builder would take no risk in handing the veteran the key, it had ensured that the working class would remain loyal to the government that provided the house.

Through the GI Bill, the United States government created a means by which the worker could realize the basic elements of the American dream and in so doing, assume the values and mores so long associated with it. The veterans of World War II are among the most conservative of today's Americans. In Levittown in the Spring of 1991, yellow ribbons and flags were flying in support of the troops in the Persian Gulf and of the president who sent them there. Similarly, throughout the 1960s and 1970s, the postwar suburbs remained apart from the civil unrest taking place in the cities and universities.

The postwar housing experience is a lesson in process. The houses were designed for and produced a commonly shared goal of postwar Americans - the promotion and reinforcement of the nuclear family. In other words, the houses fostered the family values that have for so long been associated with the "American Way of Life." One may disagree with the merits of the goal and of the uneven distribution of the means of obtaining it, but the ability of the GI Bill to secure the loyalty of the worker should not be lost in the evaluation.

Shelter for the original veterans in Levittown consumed twenty-five percent of monthly income. Their mortgages represented a commitment of from two and one-half to three years' income, with a single wage earner. A typical young couple in their middle to late twenties with one or two small children and a single paycheck could expect to purchase a house with little or no down payment. The wife could expect to remain at home to raise the children and keep the house, while the husband earned the income. Thus the terms of the housing bills helped to ensure not only that these young people would become members of the home-owning class, but that their homes would foster a traditional way of life.

The single-family home is becoming increasingly difficult to acquire. Among the middle class, young couples have postponed the purchase of a house as costs have risen and down payments have escalated. Older couples are increasingly unable to retain the houses they already own as their income is reduced due to retirement and/ or "downsizing" in the workplace. The number of homeless people has risen steadily, while doubling and tripling up within households has obscured even those numbers.

A wide variety of worker housing forms have already been deemed worthy of preservation, from the tenement of the urban immigrant, to the wood-framed cabin of the slave, or the sod hut and log cabin of the pioneer.. It is time to include the postwar Cape Cod, the house form that for over half a century has been the home of the American worker.

For many Americans, the privately-owned, entry-level house and lot, typified by those at Levittown, has become unreachable. Even for those veterans who still qualify, the GI Bill has a one hundred thousand dollar ceiling. With houses routinely selling for more than that, the concept of no-down-payment financing has become meaningless, since the buyer will have to cover the difference between the ceiling and the actual cost of the house. Moreover, a one hundred thousand dollar mortgage represents as much as four years' income for a typical two-income family, and, with real estate taxes, can consume as much as fifty percent of monthly income.

It begins to appear that the postwar American affluence, and the way of life it fostered, was not the permanent revolution it appeared, but rather an aberration. The dispersion of proprietary housing throughout a society as diverse as this one, even though it lasted only a short time, was a noble experiment, the first steps toward decent housing for all Americans. It is a period well worth commemorating.

Notes

[1] Richard Severo and Lewis Milford, *The Wages of War* (New York, New York: Simon and Schuster, 1989). Davis R.B. Ross, *Preparing for Ulysses; Politics and Veterans During World War II* (New York, New York: Columbia University Press, 1969).

[2] In combination with the Federal Housing Administration's postwar revisions of the 1934 Housing Act, the GI Bill made it possible for veterans to become the owners of homes with no capital investment and for banks and other investors to underwrite their mortgages with little risk. Virtually all risk to the private lender would be insured by the federal government under the FHA or the GI Bill and in the case of most veterans, by both. From 1944 to 1948, the down payment was gradually reduced from a minimum of fifty percent on a $2,000 FHA mortgage, to zero percent on a GI mortgage of $7,500. Typically, the FHA insured the bulk of the mortgage - eighty percent (later, ninety percent) - while the GI Bill underwrote the balance of the risk.

[3] James T. Patterson, *America in the Twentieth Century: A History* (New York, New York: Harcourt Brace Jovanovich College Publishers, 1989), 304.

[4] Hardy to Harry S Truman, 7 September 1945 (OF 63, Truman Papers, HSTL). Cited in Davis R.B. Ross, *Preparing for Ulysses.*

[5] For the persistence of the single-family privately owned dwelling as the symbol of the American Dream, see the writings of Andrew Jackson Downing, *The Architecture of Country Houses* (1850; reprint edition, New York, New York: Dover Publications, 1969); Gervase Wheeler, *Homes for the People in Suburb and Country* (New York, New York: Charles Scribner, 1855); Catharine Beecher and Harriet Beecher Stowe, *The American Woman's Home* (1869; reprint, Hartford, Connecticut: Stowe-Day Foundation, 1975), for the nineteenth century; Gustav Stickley, *Craftsman Homes* (New York, New York: Craftsman Publishing Co., 1909).

For the twentieth century see in particular such house and home magazines as *Ladies Home Journal, Better Homes and Gardens, Good Housekeeping,* and *Woman's Home Companion,* all of which regularly produced "recommended" house plans for the modern family. See also the reports from Herbert Hoover's Congressional Hearings on Housing for the twentieth century.

For a twentieth century view that is less sanguine, albeit more resigned to the single-family proprietary house at any cost, see John Keats, *The Crack in the Picture Window* (New York, New York: Ballantine Books, 1957); Marilyn French, *The Women's Room* (New York, New York: Harcourt, Brace, Jovanovich, 1977); and Gene Horowitz, *The Ladies of Levittown* (New York, New York: Richard Marek Publishers, 1980).

[6] With their production redirected to the war effort, many companies used public service ads to ensure name recognition in the postwar economy.

[7] It is important to note that in all of this rhetoric and symbolism, the typical American family was invariably white. Minority groups were omitted not only from the advantages of most of the policies, but also from consideration under them.

[8] *Fortune* 30 (August 1944).

[9] Christopher Hill examines the rise of the unattached worker in seventeenth century England in *The World Turned Upside Down* (New York, New York: The Viking Press, 1972). Studies of the early industrialization period in America show a like concern for the disruptive tendencies of young men, especially the unmarried, itinerant, day laborer.

[10] Foreword in John M. Gries and James S. Taylor, *How To Own Your Own Home* (Washington, DC: Government Printing Office, 1925).

[11] W.W. Jennings, "The Value of Home Owning as Exemplified in American History," *Social Science* (January 1938): 13, cited in John P. Dean, *Homeownership; Is It Sound?* (New York, New York: Harper and Brothers, 1945): 4.

[12] A. S. Freed, "Home Building by Private Enterprise," address before the Cambridge, Massachusetts, League of Women Voters (26 February 1936): mimeograph, 3. Cited in Dean, *Home Ownership*, 4.

[13] Quoted in Cleo Fitzsimmons, *The Management of Family Resources* (San Francisco, California: W. H. Freeman & Co., 1950), 38, 39.

[14] Dean, *Home Ownership,* 3.

[15] Frank Capra, *It's a Wonderful Life* (RKO/Liberty Films, 1946). Capra's film presents the character of George Bailey as the American "Everyman." The plot is set against a matrix in which homeownership through the beleaguered Bailey Building and Loan Company is the honorable albeit humble institution, while tenancy under the malevolent banker/landlord Mr. Potter represents the evils of a failed society.

[16] For an examination of the political philosophy surrounding the postwar American housing policies, see J. Paul Mitchell, editor, *Federal Housing Policy and Program: Past and Present* (New Brunswick, New Jersey: Rutgers University, 1985); Davis R.B. Ross, *Preparing for Ulysses,* (New York, New York: Columbia University Press, 1969); and Richard O. Davies, *Housing Reform During the Truman Administration* (Columbia, Missouri: University of Missouri, 1966).

[17] Eric Larrabee, "The Six Thousand Houses That Levitt Built" *Harper's* (September 1948): 84.

[18] Marc A. Weiss, *The Rise of the Community Builders* (New York, New York: Columbia University Press, 1987); Joseph B. Mason, *The History of Housing in the U.S., 1930-1980* (Houston, Texas: Gulf Publishing Company, 1982). See also the FHA Land Planning Bulletins for this period: No. 1, "Successful Subdivisons Planned as Neighborhoods for Profitable Investment and Appeal to Homeowners" (Washington, DC: Government Printing Office, 1940); and No. 4, "Neighborhoods Built for Rental Housing" (Washington, DC: Government Printing Office, 1947).

[19] Given the ubiquity of the single-family house, it is often overlooked that many veterans had expressed a strong desire for rental property in urban settings, rather than proprietary housing in suburban subdivision.

[20] *Successful Subdivisions,* 28.

[21] See, for example, the Bethpage Realty lease that demanded the tenant's time and labor, and limited his outdoor activities to those approved by the landlord.

[22] For an examination of the social life of blue-collar workers see David Halle, *America's Working Man; Work, Home, and Politics among Blue Collar Property Owners* (Chicago, Illinois: The University of Chicago Press, 1984); Mirra Komarovsky, *Blue-Collar Marriage* (New York, New York: Vintage Books, 1967); and Bennett Berger, *Working-Class Suburb: A Study of Auto Workers in Suburbia* (Berkeley, California: University of California Press, 1968).

See also Dobriner, *Class in Suburbia,* for the school, church and front lawn as the suburban social equivalent of these older establishments.

[23] Avodah K. Offit, MD. "The New Togetherness," *McCall's* (March 1986): 20.

[24] The investment in land accounted for at least twenty percent of the cost of each house. Thus, by adhering to the building code, Levitt could have saved approximately seven percent on each unit. Moreover, he would have been able to produce an additional six thousand units without investing in any further property.

[25] In bold type, Regulation 11 stated, "The tenant agrees to cut the lawn and remove tall growing weeds at least once a week between April fifteenth and November fifteenth." Bethpage Realty Corporation, "Bethpage Renewal 2-8149."

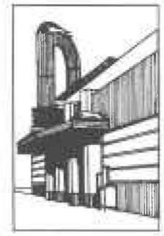
[26] Levitt enforced the lawn-mowing among his tenants by inspecting the properties and sending his own landscape crews to mow those lawns that he deemed overgrown. He would then bill the tenant for this service. By 1949, when he had completed the sale of the properties, the Levittown Property Owners Association took over his role as guardian of the community's appearance through their "community

appearance committee." See their handbooks under the section "Community Appearance," *Our Town - Levittown* (Levittown: Levittown Property Owners Association, 1952, second edition), 11.

[27] The pressure to add on to the basic structure was not simply from within the family unit. The Levitt organization began releasing suggested improvements for the homes almost as soon as they were occupied. In November of 1947, Levitt announced the possibility of erecting garages: "The *Eagle* has also learned that permission might be granted to tenants who desire to build garages in Island Trees. The style, construction, placement and other conditions must be approved by the corporation." *Island Trees Eagle* (27 November 1947): 1.

[28] The use of the original attic, in any event, had been strongly discouraged by the third of the bold-type regulations, which imposed a fine for any damage done. Bethpage Realty Lease, 1.

In December, Levitt announced the possibility of their finishing the attics, "You May Finish Attics - Levitt," *Eagle* (18 December 1947): 1.



Hyde Park-Kenwood Urban Renewal: Forty Years Later

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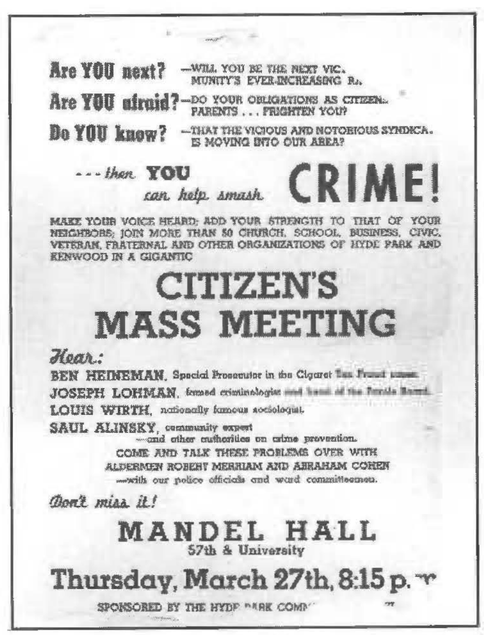
Forty years ago, in 1953, the Marshall Field Foundation gave the University of Chicago one hundred thousand dollars to create a planning unit. The grant kicked off the physical planning phase of the Hyde Park-Kenwood urban renewal project. The project has been touted as the first large-scale project of its kind, and it is the subject of voluminous commentary - much of it critical. But the critics focus on the sociological outcomes of the renewal program. In contrast, this paper will focus on the project's physical history and comment briefly on current attitudes toward what was built.

Hyde Park and adjoining Kenwood were once among Chicago's most desirable neighborhoods by virtue of their lakefront location, substantial housing stock, and easy access to downtown via Lake Shore Drive or the Illinois Central Railroad. In 1890, the University of Chicago began building in the southwest portion of the neighborhood, and three years later, the opening of the Columbian Exposition in Jackson Park made Hyde Park world-famous and led to a building boom in apartment buildings, apartment hotels, and storefronts with apartments above. Construction continued through the 1920s.[1]

But by the late 1940s, the comfortable, middle and upper middle class neighborhood was changing. Many landlords took advantage of the post-World War II housing shortage by cutting up large apartments, and some began to rent to black Chicagoans, who, until this time, had been restricted to the area north and west of Hyde Park-Kenwood. The neighborhood's total population increased from 65,000 in 1940 to 72,000 in 1950, while the number of dwelling units rose only 20 percent. During the same period, the area's black population, which had been almost nonexistent before the war, began to rise - reaching nine percent of the total population in 1950 and thirty-six percent in mid-1957.[2]

At the same time, the numbers of illegal apartment conversions - and the crime rate - were also going up. There was a strong perception that blight was creeping in. There was talk that the university was considering relocating the campus. Mass meetings were organized. The first response was a neighborhood one. In 1949, a group of residents got together and created the Hyde Park-Kenwood Community Conference. The conference did things like organizing block



Are YOU next? —WILL YOU BE THE NEXT VIC. MUNITY'S EVER-INCREASING R.

Are YOU afraid? —DO YOUR OBLIGATIONS AS CITIZEN. PARENTS . . . FRIGHTEN YOU?

Do YOU know? —THAT THE VICIOUS AND NOTORIOUS SYNDICA. IS MOVING INTO OUR AREA?

. . . then YOU can help smash CRIME!

MAKE YOUR VOICE HEARD; ADD YOUR STRENGTH TO THAT OF YOUR NEIGHBORS; JOIN MORE THAN 50 CHURCH, SCHOOL, BUSINESS, CIVIC, VETERAN, FRATERNAL AND OTHER ORGANIZATIONS OF HYDE PARK AND KENWOOD IN A GIGANTIC

CITIZEN'S MASS MEETING

Hear:

BEN HEINEMAN, Special Prosecutor in the Cigaret [illegible]

JOSEPH LOHMAN, famed criminologist [illegible]

LOUIS WIRTH, nationally famous sociologist.

SAUL ALINSKY, community expert

—and other authorities on crime prevention.

COME AND TALK THESE PROBLEMS OVER WITH ALDERMEN ROBERT MERRIAM AND ABRAHAM COHEN

—with our police officials and ward committeemen.

Don't miss it!

MANDEL HALL

57th & University

Thursday, March 27th, 8:15 p.

SPONSORED BY THE HYDE PARK COM

Fear of crime was a major impetus to the Hyde Park-Kenwood urban renewal plan.

groups and getting local lawyers to take recalcitrant landlords to court.

The idea of massive physical change - of redevelopment - came from another organization, the Southeast Chicago Commission, which was formed in 1952 in large part by the University of Chicago. Its executive director, a lawyer named Julian Levi, got the state legislature to amend a 1941 law that allowed the use of eminent domain to clear slums. The amendments, passed in 1953, made slum *prevention* a public purpose. These ideas were later incorporated into the federal housing act of 1954.

The new law was meant to cover areas like Hyde Park - that were merely in danger of becoming slums. They were called "conservation areas." Today, that term is used almost synonymously with preservation. In the early 1950s, it simply meant more selective demolition.

Earlier state legislation - in this case a model for the 1949 federal housing act - had been used for the massive Lake Meadows and Prairie Shores redevelopment project around Michael Reese Hospital to the north of Hyde Park. The first Hyde Park projects were closer to the Lake Meadows total clearance model. They were the projects known as Hyde Park Redevelopment Projects A and B.

In 1953, using that one hundred thousand dollar grant from the Marshall Field Foundation, and another two hundred thousand dollars from the University of Chicago, the Southeast Chicago Commission created its own planning unit and hired Jack Meltzer, who had been planning director for Michael Reese Hospital. He was charged with producing a redevelopment plan for forty-seven acres.

During this process, the definition of "blight" became an issue. A case had to be made for tearing down structures that actually looked pretty good. The plan produced for Hyde Park A and B called for demolishing 209 buildings, including some sentimental favorites like the 57th Street Art Colony, a holdover from the 1893 World's Fair, and the 55th Street and Lake Park Avenue shopping strips. In all, the plan called for tearing down about twenty percent of the area's housing units. The buildings that were demolished were to be replaced with over 712 new housing units and a shopping center.[3]

The redevelopment proposal for Hyde Park A and B was approved by the Chicago Land Clearance Commission in 1954. A year later, this commission had already begun demolition. Meanwhile, Meltzer was working on an overall renewal plan for the entire area, which covers about 900 acres. That overall plan, which was more conservation-based, produced what is generally acknowledged as the largest federally aided renewal project up to that time. It was approved by the Chicago Plan Commission in September 1958.

Several alternative plans had previously been offered - and rejected. One was prepared by University of Chicago graduate students in planning under the direction of Martin Myerson, another by Reginald Isaacs' students at Harvard, and a third by Ludwig Hilberseimer of the Illinois Institute of Technology.

The 57th Street Art Colony was a casualty of the urban renewal era.

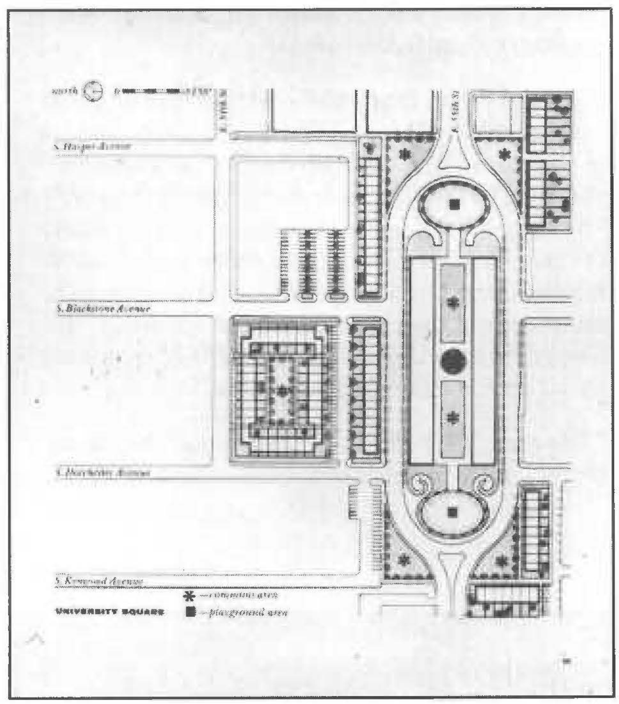
Hilberseimer's plan was offered as an alternative to the redevelopment plans that were submitted to the Land Clearance Commission in 1954. He recommended that residential, working, and recreation areas be further separated and that the area's population eventually be reduced by two-thirds. His site plan showed how he would encourage what he called "settlement units" by dead-ending streets at linear parks and routing traffic around residential areas.

At another point, Harvey Perloff, then in the planning department at the University of Chicago, asked architect Bertrand Goldberg to prepare a design for two centers along 55th Street. One, which he called a "lighted center," was to be between Kimbark and Lake Park. Perloff envisioned it as a way of livening up the neighborhood in the evening by providing bookstores, coffee houses, and similar attractions. The second center, which would stretch north along Lake Park, was to be an "arts and building center." It was supposed to be a place to buy products and procure services related to home improvement, including art galleries and art supply stores. It was also to include rental space for artists' studios.[4]

In 1954, the redevelopment contract for Hyde Park A and B was awarded to Webb and Knapp of New York, the firm headed by flamboyant developer, William Zeckendorf. The project included almost 250 townhouses, two ten-story apartment buildings, and a shopping center, all designed by I.M. Pei (who was Webb and Knapp's resident architect at the time) and Chicago architect Harry Weese.

The townhouses, which sold for twenty thousand dollars to forty thousand dollars, were simple buff brick rowhouses arranged around very urbane courts and squares. "Old world charm," said the brochures. The apartment buildings, which were sited in the middle of a widened 55th Street, contained 550 units.

The shopping center, which was completed in 1959, covered about seven acres with about 75,000 square feet. It included a neighborhood institution, the supermarket run by the Hyde Park Cooperative Society. The shopping center was built around a courtyard, where the Coop has for years sponsored plant and book sales. Another amenity was the Coop coffee bar. One drawing by Harry Weese also showed an



I.M. Pei's plan included several urbane townhouse groupings.

overpass connecting the shopping center to the residential area, but it was never built.

The point of all this redevelopment was, of course, to stop what was perceived as the neighborhood's downward slide. And to a large extent, it worked. The neighborhood did hold much of its upper income population. Its average income today is $69,000, thirteen percent above the metropolitan area as a whole. Median home value is $211,000. The current population of about forty-one thousand is fairly evenly divided between black and white residents, although the geographic distribution is far less even. There has also been new development in west Hyde Park and plans for new renewal projects in North Kenwood and Woodlawn.

In an interview last year, Jack Meltzer said he considered redevelopment a success, although he acknowledged in his 1984 book, *Metropolis to Metroplex,* that less clearance might have been appropriate in certain areas.[5]

Over the years, though, the project has received much criticism. Jane Jacobs, in *The Death and Life of American Cities,* took Hyde Park-Kenwood's planners to task for their definition of "blight." "By blight," she said, "they mean that too many of the college professors and other middle-class families steadily deserted this dull and dangerous area and their places were often, quite naturally, taken by those with little economic or social choice among living places."

"The plan," she continued, replaces "chunks of blight" with "chunks of Radiant Garden City designed, as usual, to minimize use of the streets."[6]

On the whole, however, most of the criticism has been about the sociological effects of urban renewal, not the physical details of the plan. James Q. Wilson suggested in an essay that first appeared in the *Journal of the American Institute of Planners* in 1963 that the reason for the lack of interest was that the neighborhood people, the Hyde Park-Kenwood Community Conference, had relatively little to do with the day-to-day details of the planning.[7]

As a long-time resident of the area, I've engaged in my share of urban renewal-bashing - on both sociological and architectural grounds. Lately, though, I've begun to appreciate what was done and to wonder about the increasing tendency to throw away buildings as quickly as we throw away household appliances.

The Hyde Park shopping center is a case in point. It was built of the same buff brick as the townhouses and with the same low scale. The courtyards and sidewalks were shaded by freestanding thin shell canopies. Harry Weese, who was largely responsible for the design, pointed out that those canopies also concealed the rooftop cooling towers.[8]

Both the canopies and the brick - and much of the courtyard - are now gone, however. For the last few years, the shopping center has been going through considerable management turmoil, as the University of Chicago, which has owned it since 1984, decided what to do with it.

Second from left is Julian Levi, who spearheaded the renewal effort. Planner Jack Meltzer is standing. Architect Harry Weese is to his right.

In 1989, the University came up with a plan to triple the center's size and add a double-deck parking garage, a hotel, and a movie theater, in effect turning it into a regional shopping center. That plan failed when the downtown banks refused to finance it.

The smaller version of that plan, the one that is now being carried out, is a six million dollar remodeling that is essentially turning the courtyard center into a strip mall with a smaller courtyard and a number of seemingly obligatory postmodern design details. Recladding its buff brick walls with red brick and "rusticated" stone disrupted the shopping center's harmonious relationship with the townhouses, which shared the same materials.

The current shopping center manager says the original plan, including the courtyard was "dated." An architect working on the remodeling was quoted recently as saying, "Consumers are looking for a shopping experience." And that means something new. A shopping center "expert" quoted recently in a local newspaper said shopping centers need a "facelift" every ten years and a "major overhaul" every twenty years. By that reckoning, the Hyde Park shopping center is long overdue. One wonders, though, how long this update will last.

In recent years, inappropriate storm doors and other additions have marred the townhouse facades.

Most Hyde Parkers seem oblivious to these changes, although one local architect, who particularly appreciates the canopies, did suggest that they simply be replaced with glass, creating a galleria effect. Other neighborhood residents have noted that the smaller courtyard makes it difficult to hold community events like the annual Coop book fair.

The townhouses have also suffered from some gross remodeling in the form of aluminum awnings, obtrusive sheet metal roof coping, and inappropriate storm doors. These additions interrupt the regularity of the rowhouse facades, facades that are as elegant in their way as the rows of eighteenth-century townhouses that we admire in English towns.

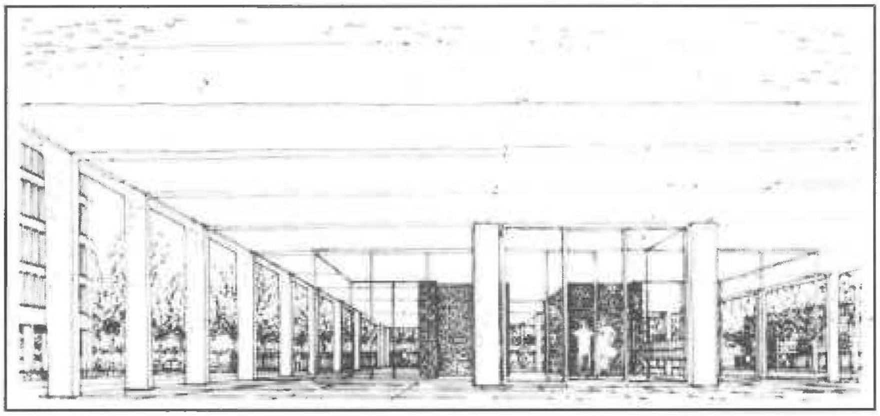
I.M. Pei designed similar buildings in New York and in Philadelphia. In Philadelphia, Pei was praised for interrelating his apartment towers and townhouses with the eighteenth-century Society Hill neighborhood.[9] In Chicago, the two University Apartment buildings simply served to sever the two parts of the community, earning them the nickname, "Monoxide Island."

So why are these buildings worth saving? For one thing, they form an ensemble. Just the opposite is happening in Woodlawn and in North Kenwood-Oakland, the areas bordering Hyde Park-Kenwood. Both neighborhoods are certainly ripe for renewal. In 1992, some 70 percent of their land was vacant, with over half of those empty lots owned by the city. But the buildings that are going up, at least in North Kenwood-Oakland, are detached, single-family houses, and they offer little common space.

In contrast, the Hyde Park buildings created a new context, even if they didn't always pay enough attention to the context that was there before. They consider the public interest and the public realm.

In addition, the shopping center, in its pre-remodeled state, and the townhouses represent a kind of modern vernacular in their simplicity and use of low-key materials. Their very plainness makes them seem calm and inviting, especially in contrast to the neo-French Provincial tract manors, the new monster houses that dot the suburban landscape.

Biologists use the term life cycle to describe the stages an organism goes through. And others,



An entrance to University Apartments, as conceived by I.M. Pei. The addition of security guard stations has compromised the original design.

particularly economists, have picked up on the term, for instance to talk about a product's life cycle. And if you think of buildings as products that outgrow their "useful life," then you start to think of them as temporary. Less and less, it seems, do we think of new buildings as being permanent, which might be why we do not build maintenance costs into our budgets.

But while the life cycle of buildings seems to be getting shorter, our historic preservation laws have not changed to reflect that fact. With few exceptions, the National Register of Historic Places imposes a fifty-year cutoff, yet many endangered modern landmarks - including some that are in renewal projects like Hyde Park-Kenwood - are less than that. And they're not getting much respect.

In Chicago, for instance, Walter Netsch's twenty-seven-year-old University of Illinois campus is being radically changed by a seven million dollar renovation in which the upper level walkways and amphitheater have been torn down, to be replaced by a plaza. Netsch admitted that there were problems with the campus, but he said many of them were maintenance problems. He called the redesign "kind of a suburban mall revision...that has very little to do with the character and guts of Chicago-area architecture."

Also in Chicago, there's talk of tearing down the swooped-roof theater at Bertrand Goldberg's Marina City, which was completed in 1967. Another local building, the Hancock, was saved in the nick of time from a chalet-type atrium addition. The most recent controversy is over Mies van der Rohe's Arts Club, which seems to have lost its last-minute fight to remain in its original space.

Some of these buildings and others, although not the Hyde Park-Kenwood townhouses, are on a list of significant under-aged landmarks prepared by a committee of the Landmarks Preservation Council of Illinois. The list is a good start for those of us concerned about preserving the recent past. But more is needed. We already have societies dedicated to the preservation of commercial and industrial sites. Why not a Society for the Preservation of Underaged Landmarks?

References

[1] For basic Chicago development history, see Ann Durkin Keating, *Building Chicago: Suburban Developers and the Creation of a Divided Metropolis* (Columbus, Ohio: Ohio State University Press, 1988) and Harold M. Mayer and Richard C. Wade, *Chicago: Growth of a Metropolis* (Chicago, Illinois: University of Chicago Press, 1969). Hyde Park-Kenwood covers 2.4 square miles. The neighborhood stretches from 47th Street on the north to 60th Street on the south, and from Cottage Grove Avenue on the west to Lake Michigan on the east.

[2] One source of such statistics is Martin Millspaugh and Gurney Breckenfeld, *The Human Side of Urban Renewal* (New York, New York: Ives Washburn, Inc., 1960). Arnold R. Hirsch in *Making the Second Ghetto: Race and Housing in Chicago, 1940-1960* (Cambridge, England: Cambridge University Press, 1983) describes the spread of the Black Belt. In 1948, the Supreme Court outlawed restrictive covenants, spurring real estate speculation.

Also see *Hyde Park/Kenwood: A Case Study of Urban Renewal* by Valetta Press (Chicago, Illinois: University of Chicago Center for Policy Study, 1971); Press notes that the 1950 census showed that 64 percent of the buildings in Hyde Park-Kenwood were built before 1920. Along the commercial strips, 80 percent were built before 1905. Also see *A Neighborhood Finds Itself* by Julia Abrahamson (Harper and Brothers, 1959) and *The Politics of Urban Renewal: The Chicago Findings*

by Peter H. Rossi and Robert A. Dentler (Glencoe, Illinois: Free Press of Glencoe, 1961).

According to Martin Millspaugh, the Hyde Park effort was probably the largest federally aided renewal effort "of its type up to that time, involving $43 million in federal and city funds to spur some $27.5 million of new building and perhaps $30 million more in rehabilitation." The plan called for tearing down about twenty percent of area's housing units.

Also see the Hyde Park Historical Society papers, which are in the special collections department of Regenstein Library at the University of Chicago, and the papers of the Metropolitan Housing and Planning Council at the University of Illinois at Chicago library. Another useful record is the annual reports of the Chicago Plan Commission.

[3] Urban renewal planner Jack Meltzer says today that he wants to make it clear that the point of the project was not to remove blighted buildings. It was to preserve the community so people would want to live there. Blight was the legal term, but not the real issue, he says.

[4] According to Hilberseimer's plan, schools and playgrounds were to be located in the parks. The layout was also meant to allow children to walk to school without crossing any streets. See *Ludwig Hilberseimer: Architect, Educator, and Urban Planner* by Richard Pommer, David Spaeth, and Kevin Harrington (Chicago, Illinois: Art Institute of Chicago, 1988). Also see Harvey S. Perloff, "Urban Renewal in a Chicago Neighborhood: An Appraisal of the Hyde Park-Kenwood Renewal Program," *Hyde Park Herald,* August 1955.

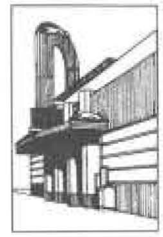
[5] Jack Meltzer, *Metropolis to Metroplex: The Social and Spatial Planning of Cities* (Baltimore, Maryland: Johns Hopkins University Press, 1984). Meltzer now lives in Chevy Chase, Maryland. The Community Conservation Board published the two volumes of the Hyde Park-Kenwood Urban Renewal Plan.

[6] Jacobs, Jane, *The Death and Life of Great American Cities* (New York, New York: Vintage Books, 1961). Charles Abrams, *The Language of Cities: A Glossary of Terms* (New York, New York: Viking Press, 1971). "The main weakness [of urban renewal]," Abrams wrote, "is that the program has assumed that rebuilding a few slum or blighted areas would automatically make a city sound. The city in the United States, however, is at bay for reasons other than the slum problem. With middle-and upper-income families deserting it, with tax sources diminishing at the same time as the city becomes host to new waves of the nation's poor, a few reconstructed areas in or near its central business districts cannot make it whole....If urban renewal is to prove effective in relieving the ills of cities, it has to be one small part of a much bigger bundle of aids. Instead it is proffered as a specific."
Abrams also pointed out a contradiction in the urban renewal program. He noted that investors were reluctant to invest in real slums; instead they went after "prime or semi-prime (gray areas)."

[7] See James Q. Wilson, *Urban Renewal: The Record and the Controversy* (Cambridge, Massachusetts: MIT Press, 1966). Jack Meltzer said in the interview cited earlier that this was not so. He says the leaders of the Hyde Park-Kenwood Community Conference were involved at every stage and that the group even gave him an award for his "responsiveness to the community."

[8] In *Stores and Shopping Centers,* edited by James S. Hornbeck (New York, New York: McGraw-Hill Book Company, Inc., 1962).

[9] Pei's Society Hill project drew considerable praise, from among others, the longtime Philadelphia planning director, Edmund Bacon.



"Down Lego Lane": Alexandra Road and Issues in the Preservation of Post-War Public Housing in London

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Introduction

This paper describes the efforts that English Heritage has been making, and some of the difficulties that have been encountered, in seeking to conserve a large public housing estate in north London, the Alexandra Road Estate.

In August 1993, the Alexandra Road Estate, which had been completed only fifteen years earlier, became the "youngest" listed building in Britain; it was also the first British post-war housing estate to be listed. Listing was the direct result of concern, within English Heritage and national amenity groups,[1] over the quality of repairs and alterations that were being funded by the British Government (Department of the Environment) through an "Estate Action" programme. This was a funding programme introduced to address widespread concern about the serious deterioration that had been allowed to occur in living conditions in many public housing estates in Britain. The issues raised by the Estate buildings extended beyond technical problems of concrete repair and replacement and upgrading of complex services. Overcoming estate management problems, and gaining the support and goodwill of both tenants' groups and the local authority housing department, were crucial to successful and practical conservation. Conservation Area designation, for a broader area than the buildings initially listed, will shortly provide necessary additional protection for closely related buildings. The park, which is an integral part of the Estate, is being considered for inclusion in the Register of Historic Parks and Landscapes.

Legislative framework

Listing is the key concept in the British approach to the conservation of individual buildings of architectural or historic merit. The final decision on whether or not to list a building is taken by a politician, the Secretary of State for the Department of National Heritage, but with the advice of expert advisers in English Heritage (formally known as The Historic Buildings and Monuments Commission). There are three grades of listing, Grade I, Grade II*, and Grade II. Alexandra Road was listed at Grade II*. Grade I and Grade II* buildings account for only two and four percent respectively of the total listed building stock and receive higher levels of protection and more grant aid than the majority of Grade II buildings. The owner of a listed building is obliged to seek listed building consent from the local planning authority in which the building is situated if he/she wishes to make any alterations that would affect its character. The procedure for obtaining consent varies according to the grade of the building, its location in or outside of London, and its ownership. In cases such as the majority of the Alexandra Road Estate buildings, where the local planning authority is also the owner of the building the application is referred to the Department of the Environment if the local planning authority wishes to grant consent.[2] English Heritage acts as adviser to the DOE, although in practice it has most potential for constructive impact by directly advising both the planning department and the housing department of the local authority before applications are submitted.

There are two other conservation measures that are also employed in England and have proved useful at Alexandra Road. Local authorities have a duty to designate as conservation areas

any areas of "special architectural or historic interest" within a town or village. Designation gives a general control over demolition of buildings within the area. It also places on the local authority a duty to formulate and publish proposals to promote the preservation or enhancement of the area. Guidance on conservation area designation and management is set out in an English Heritage leaflet, "Conservation Area Practice."[3]

The third measure relates specifically to historic parks and landscapes. A register of Historic Parks and landscapes throughout England and Wales is currently being compiled as a basis for a more comprehensive understanding of their significance. Although inclusion on the register offers no specific additional statutory controls, local planning authorities must protect registered parks and gardens when preparing development plans and in determining planning applications.

History

The Alexandra Road Estate was the most ambitious of a series of low-rise, high density housing schemes in the 1960s and early 1970s, for which Camden Council's pioneering team of socially committed architects, led by Sidney Cook, gained international recognition. The major portion was designed by Neave Brown of the Camden Architect's Department in 1968 but not completed until 1978. It replaced a series of early nineteenth-century villas that had fallen into disrepair. Brown had studied at the Architectural Association at the same time as Patrick Hogkinson whose Brunswick Centre building in Bloomsbury, London bears a strong resemblance to Alexandra Road. Both were influenced by the ideas of Peter Smithson, a member of the Team X group who had published radical ideas about housing design.[4] From Smithson, Brown took elements of a Brutalist aesthetic and an interest in developing a habitable "urban megastructure" that could be infinitely extendable. He also looked directly to European examples of low-rise high-density housing particularly Le Corbusier's Roq et Rob project of 1948 and Atelier Five's Siedlung Halen, Switzerland, both of which used a stepped section.

The Estate consists of three gently curving stepped concrete terraces containing one- and two-storey apartments and houses. These have complex cross-sections to allow all units to have a generous exterior terrace and to give each as direct an access as possible on to the ground level pedestrian streets, thereby encouraging the intensive level of informal human interaction that Brown sees as a key part of urban life.

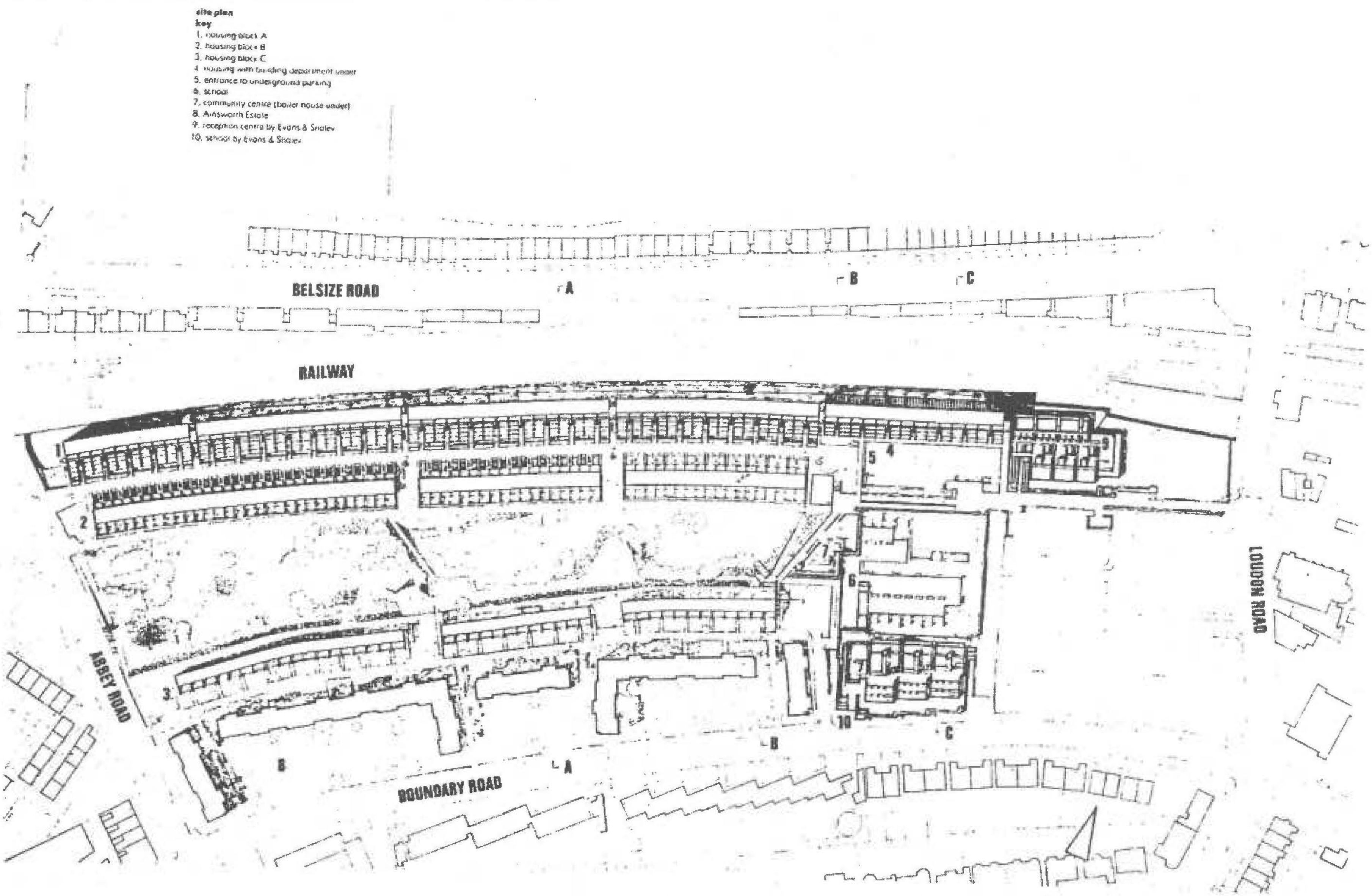
In contrast to the tower blocks, whose popularity was only just beginning to wane, the buildings rise to a maximum of six storeys, but achieve very high densities by means of innovative three-dimensional planning. There are over five hundred dwellings on the Estate, together with community facilities, at a density in excess of two hundred persons per acre. The three terraces, together with the Community Centre, Youth Club, and boiler room which forms a "cap" linking them and addressing the main public spaces of the scheme, were listed at Grade II. Some parts of the Estate, however, notably a special school for disabled children by the council's own architects, two buildings by Evans & Shalev and two by Tom Kay, were excluded from the listing. Although all are of considerable architectural merit they are not of Grade II standard, and a building cannot be listed at the lesser Grade II until it is thirty years old.

Construction

The Estate was built by McInerney & Sons, Ltd., whose preference for in-situ concrete construction was taken into consideration by the architects from an early stage. Floors and walls of Block A and cross walls of Blocks B and C are of in-situ concrete. Where visible this is a very attractive white concrete with a carefully selected aggregate and is board marked. There are also precast units, which form steps and balconies, and rendered elements. Doors and windows are of stained timber of robust cross-section. All services were run in PVC conduit cast in during construction. The Estate has a highly innovative district heating system, which was initially a controversial choice and has consistently failed to perform adequately. Hot water coils fed from a central boiler were cast into the cross walls between flats. This system was designed to provide background heating only, but poor balancing and attempts to produce higher temperatures throughout the block have resulted in uneven heating and considerable tenant dissatisfaction.

Critical reception

Technical problems and a labour shortage caused the project to be severely delayed and contributed to an escalation in costs from an estimated £3.4 million in 1978 to a final figure close to £19 million. Resulting accusations of financial mismanagement, coupled with the


site plan
key
1. housing block A
2. housing block B
3. housing block C
4. housing with building department under
5. entrance to underground parking
6. school
7. community centre (boiler house under)
8. Ainsworth Estate
9. reception centre by Evans & Shalev
10. school by Evans & Shalev
BELSIZE ROAD
RAILWAY
LOUDON ROAD
ABBEY ROAD
BOUNDARY ROAD

Site plan

Looking west along Rowley Way, from the highlevel walkway to block A. The tower block in the distance was built by Camden in the mid 1960s (Photo courtesy of English Heritage)

Block A (Photo courtesy of CFA Croft)

decreased popularity of large-scale high-density schemes, blighted the Estate's handover to the Housing Department despite an enthusiastic reception from the architectural press. The senior Housing Surveyor was convinced that there would be extensive maintenance problems caused by poor detailing, shoddy workmanship, the principle of using buried services, and an unrealistic view of how tenants would treat their homes. He visited the "disaster area" and made a preliminary list of thirty points predicting tenant dissatisfaction with "diabolical bath arrangements" and the architect's "obsession with sliding doors." He felt that the design was extravagant and predicted massive future costs: "All of the ballustrading handrails etc. inside are of specially made timber which while the latest thing in habitat showrooms is going to require a considerable amount of expensive maintenance in the future."[5]

His final point was a fundamental attack on the architect's idealism:

> The overall impression of these flats is that they are designed for the upper middle class with fairly large incomes who having made the largest purchase of their lives will cherish it and treat it with every respect as they will not be able to afford high cost maintenance by private builders. It is apparent that no attempt has been made to design with Council house tenants, 60 year life, low budgets in mind.[6]

The most ambitious assessment of the Estate was Robert Maxwell's account in the *Architectural*

Review. His praise is elegiac and primarily focuses on the dream that Alexandra Road represents, a highly selective socialist-modernist dream that is seductive but disorientating: "we are not sure if this is the real world or a simulacrum of it."[7] He describes his impression on visiting the site:

Here at Alexandra Road one can still believe in the power of design. Everything is still brave and new. The concrete is still white, the warm brick paving unbroken, the burgeoning plants well protected by reams of intact chestnut paling. Every aspect of the exterior from access guard-rails through to the communal flower-boxes has a well designed robust feel to it: nothing skimped, nothing cheap; there is nothing makeshift to invite casual violence.[8]

Although the future ought to have been optimistic, there is an implied threat and a tension that perhaps remains key to the ambiguity of responses the Estate still arouses.

Essentially, then, the Alexandra Road Estate is a set of buildings that are in themselves of high architectural quality and that also have historic significance as an outstanding example of the attempts made in Britain in the 1960s and 1970s to provide good high-density public housing. Partly as a result of their innovative design, they have a poor reputation in terms of quality of construction.

Detail of block A showing surface mounted eletrical conduit and poorly matched concrete repairs (Photo courtesy of CFA Croft)

Conservation problems

The current problems with the buildings themselves can be divided into three categories:

i) those that are the result of poor maintenance
ii) those that are the result of flawed original design or construction
iii) those that are the result of changing requirements and a generally higher level of expectation by present day residents.

The Estates's initial reputation as an expensive "white elephant" has produced a perceptible disaffection amongst Camden Housing Department staff responsible for an estate that is seen as a drain on the resources of a tightly stretched maintenance budget. The main areas where lack of maintenance has had an impact are external joinery and landscaping.

Residents are aware that window replacement is common practice as part of public housing refurbishment. Timber windows are frequently replaced with UPVC units, which are perceived by tenants to be easy to keep clean and lighter to operate. Extensive marketing in the private sector has also established them as a very public expression of relative affluence. However, the specially developed stained timber widows at Alexandra Road are undoubtedly a key element in the appearance of all main elevations, and it was agreed that replacement UPVC windows would not be acceptable in design terms. A condition survey showed that despite failure to carry out any of the restaining programme recommended at handover, most of the windows were in reasonable condition and that repair and replacement of some opening lights was a viable option. Specific operational problems and increased security could be addressed by improving ironmongery.

The park had become very overgrown and many tenants had ceased to use it, afraid of the large dogs reputed to be running loose and of the drug users alleged to meet in the playgrounds. The appointment of specialist landscape consultants, working with a limited budget, led to the proposal of a realistic management programme - better control of dogs (horizontal dog grills at the entrances to play areas and grassed seating

areas), new play equipment and safety surfaces - without undermining the vigorous diagonal structure of the original design and greatly benefiting from the original strength of form and established planting.

The Estate Action works have addressed several areas of poor original design or construction. The concrete had been successfully cleaned prior to listing, but concrete repair had been very unsatisfactory. Insufficient cover to reinforcement had been dealt with in a piecemeal manner and a very large number of small-scale patch repairs had been carried out using a grey cementitious acrylic-bonded proprietary system, which is very unsightly. A mix prepared on site had produced a far preferable sample but this was rejected because it would not have a manufacturer's guarantee. It still remains unclear whether it was ever intended to top dress these repairs, or whether this can be done satisfactorily. Painting the entire building was ruled out, not least because of the long term maintenance requirement this would entail. In the future, repairs will be carried out using specially factory-batched materials that will meet the Council's requirement for a guarantee but will match much better. It will be possible to replicate the board marked finish reasonably well, but the long term performance and relative discolouration of the repairs is difficult to predict.

The third category of problems, those relating from changing requirements, have generally to do with security and public safety. Increasing lighting levels throughout the Estate has proved possible, principally by introducing free-standing column lighting. Simple globe fittings are available that compliment the Estate architecture reasonably well, particularly if positioned with respect to the rhythm of the terraces. New fittings were also found to fit in the concrete recesses, and for Block C, it was possible to reuse existing conduit or to bury new wiring. It is currently being argued that it may be necessary to boost lighting levels still further to enable CCTV monitoring.

There is also a strong desire amongst residents to personalise the exteriors as well as the interiors of their homes. New panelled front doors, fake leaded-light windows, and painted woodwork are starting to proliferate. In part, this need to express "ownership"[9] is a specific facet of public housing where uniformity has symbolised authoritarian control and not voluntary compliance to a standard.

Conservation Area Designation

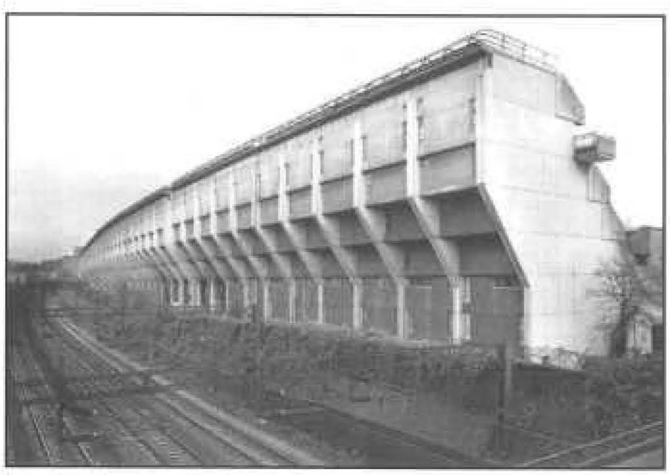
In addition to the repair and upgrading of the existing buildings, however, there are wider issues that have to be faced. As mentioned above, parts of the Estate have not been listed. Shortly after the initial listing, the proposed demolition of 48 Boundary Road, one of two estate buildings by Evans and Shalev that are not covered by the listing, was opposed by English Heritage on the grounds that the proposed new building in a neo-vernacular style would have a detrimental effect on the setting of the listed buildings. This highlighted a broader problem: how best to safeguard the overall estate environment and the many unlisted buildings, the majority of which remain in Local Authority ownership, that are part of the original concept and of considerable interest.

Camden Planning Department initially did not see designation of an Alexandra Road Conservation Area as a priority, but were encouraged to proceed when the Secretary of State authorised English Heritage to use its powers to do so. A survey of the Estate, carried out jointly by the Planning Department and English Heritage, recorded the current state of all the properties, and the Housing Department was asked to coordinate with enhancement proposals by requiring removal of alterations that were contrary to tenancy and lease agreements: principally the removal of satellite dishes that had proliferated throughout the estate. A draft guidance leaflet was prepared and public consultation carried out with English Heritage and Camden Planning Department staff holding evening meetings on the Estate in October and November 1994.

Predictably, the consultation process has brought to the forefront some residents' concerns that conservation issues may not always coincide with their own desires and financial priorities. In Britain there has long been concern that the people who actually live on public housing estates should have ample opportunity to participate in decisions that can have a big impact on their homes and the quality of their lives. In recent years, the Government has sought to tackle the problem, and its recommendations have influenced the course of events at Alexandra Road. Some properties on the Estate have been bought by tenants under the Government's "Right to Buy" scheme. In addition, a Tenants Management Committee

Top:
Block B (Photo courtesy of English Heritage)

Middle:
Home for Young Physically Handicapped by Evans and Shalev (Photo courtesy of English Heritage)



Bottom:
Rear Block A, facing the railway to which it forms an acoustic barrier (Photo courtesy of English Heritage)

(TMC), The South Hampstead Housing Co-op, was established in 1991 with the aim of increasing tenant participation in Estate management.

The relationship between Camden Housing Department, still the owner of most of the Estate, and the TMC has presented some problems for English Heritage's handling of the current repairs. Whilst the TMC are responsible for day-to-day management and repairs, major capital works remain the responsibility of the Council. When the Estate action bid was initially mooted, the TMC approached a number of architects with a view to choosing suitable consultants to run the project. Confusion arose as it became clear that the council would themselves be the "client" for the works and chose to employ their own Building Design Services Team (BDS), despite considerable reservations of the TMC and tenants. Ensuring that the TMC is appropriately involved in the decision making process has been essential to ensuring that residents do not feel that listing is an undemocratic imposition of new controls to replace those that have been relinquished by the Council.

In the end, efforts to conserve a big housing estate, such as Alexandra Road, will only succeed if they win the sympathy and backing of a majority of those who live there. Conservation could too easily become regarded as something negative, an external force preventing people from making the little individual changes they want to make to their own homes.

Conclusion

It has been suggested that the conservation problems raised by post-war buildings will be fundamentally different in nature from those encountered with buildings of previous periods. The reasons used to support this view include the use of unfamiliar materials and methods of construction, the concept of buildings being designed for a limited lifespan, and the large size of many modern buildings. In fact, none of these issues are ones that have not been faced before. The existing legislative framework and conservation philosophy can accommodate the problems encountered at Alexandra Road, and although further research is undoubtedly needed in some key areas, most notably into concrete repair methods, conservation of the Estate seems practically viable. The biggest challenge that English Heritage faces is the need to secure full democratic support and enthusiasm for conservation, so that residents may benefit from the controls and design care that preserve and enhance the great set-piece architectural works of previous centuries, such as the Royal Crescent at Bath and the terraces of the great London squares, from which the Estate's architect drew his initial inspiration.

Notes

[1] The Twentieth Century Society and DoCoMoMo, initially contacted by one of the residents.

[2] These procedures and Government advice on criteria by which to determine applications are laid out in the *Planning (Listed Buildings and Conservation Areas) Act* (1990), The Department of the Environment *Circular* (August 1987), and the Department of the Environment and the Department of National Heritage *Planning Policy Guidance: Planning and the Historic Environment* 15 (September 1994).

[3] English Heritage, "Conservation Area Practice" (1993).

[4] A. and P. Smithson for Team X, "Criteria for Mass Housing," *Architectural Design* (first published 1957, September 1967): 393-394; Peter Smithson, "Density, Interval and Measure," *Architectural Design* (September 1967): 428-429.

[5] Handover report by David Howard, memo from Senior Housing Surveyor to Housing Estates Manager, 12 March 1976. This paragraph is point 29.

[6] Ibid., point 30.

[7] "Housing School and Community Centre, Alexandra Road, Camden, London," *Architectural Review* (August 1979): 88.

[8] Ibid., 86.

[9] This process has been accelerated by the "Right to Buy" scheme, which has allowed some tenants to buy leasehold ownership of their homes. Although leasehold agreements theoretically impose the same restrictions as tenancy agreements, they have not been enforced and now both leaseholders and rent-paying tenants flout controls.

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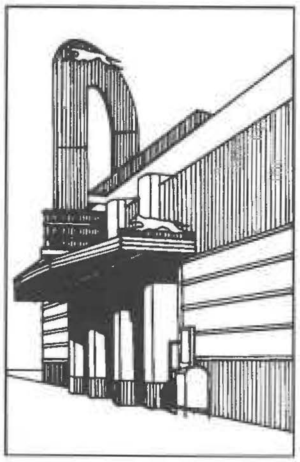
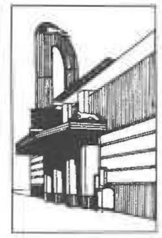


Organizing to Preserve the Recent Past



Organizing to Preserve Modern Architecture: The Modern Architecture Preservation League

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In the winter of 1989, the Denver Public Library began to campaign for a bond issue to finance capital improvement of the library's building stock. Part of those dollars were to be used to expand the Central Library located in Denver's Civic Center, the heart of the cultural and political life of the city and state. Rumors, followed by library-commissioned planning studies, confirmed that the administration intended to demolish the 1955 International Style library and construct a replacement on the site.

Dedicated followers of Modern architecture and design rebelled. The Modern Architecture Preservation League (MAPL) was born.

Founding Principles
MAPL is distinguished by two key, founding principles. First, MAPL contends that a building can rationally be determined to be historic regardless of its chronological age or architectural style. Second, MAPL contends that the need to preserve a historic structure is dictated not by its age, but by the threat of its destruction.

The age of Modern buildings is the most common justification for excluding them from consideration for historic preservation. The dictum that the passage of time is essential to gain the perspectives necessary to determine whether a structure is historic, and therefore worthy of preservation, is codified in the fifty-year rule of the National Register of Historic Places. This premise defies reason. History is a continuum, the ancient past no more historical than the recent past.

When National Register criteria are examined, it is apparent that the factors necessary for a building to qualify as a geographic, cultural, historic and architectural landmark may be present at the time of its completion. The only possible exception is the association of the building with some subsequent, historical event. This is true whether a building is five, fifty, or five hundred years old.

A number of the Civic Center's significant Modernist buildings certainly qualified for National Register listing upon their completion. These include Burnham Hoyt's 1955 Central Library, spared from demolition, and the neighboring 1971 Gio Ponti/James Sudler Denver Art Museum, where a recent multi-year rehabilitation project was totally respectful of the building, even restoring a number of lost features. The 1960 University of Denver Law School, designed by Perkins and Will with Temple Buell, did not fare so well. It was lost, stripped to its structural elements.

Stylistic prejudice was obviously the motivating factor in ignoring the historic nature of these major Modernist public buildings. Guidelines clearly exempt buildings in National Register Historic Districts from age restrictions, yet all these important structures were relegated to non-contributing status.

To extend MAPL's philosophy to its logical conclusion, the Michael Graves library addition currently under construction is eligible for landmark status even now, prior to its completion. This is true irrespective of its age, its architectural style, or how well the building is "liked."

MAPL's Role in the Preservation Community
MAPL also distinguishes itself on a functional

level. Entirely dependant on the modest funding and volunteer services provided by its membership, it was necessary to identify ways to quickly and economically affect the preservation of Modernism.

MAPL's appearance was initially greeted with trepidation, but quickly won the respect of serious local preservationists, planners, and historians through the quality of its scholarship and presentation. This was crucial as MAPL was conceived from its inception as an adjunct to existing state and local planning and preservation organizations.

Stylistically, MAPL's concerns begin in the 1890s with Richardsonian Romanesque and continue up through Modern-related buildings currently under construction. A number of these stylistic categories were embraced by existing historic preservation organizations. It was logical to identify well-established groups that were sympathetic to some early Modern styles and work to expand their interests to include others such as Art Deco, Art Moderne, International Style, Formalism, Brutalism, and Late Modern.

MAPL contributes to these partnerships by volunteering survey, research, writing, and presentations exploring the history of Modern architecture in the city, state, and region. In this capacity, MAPL has provided volunteer services to preservation and professional organizations; city and state agencies; museums; elementary, middle and high schools; universities; and religious, neighborhood, community, and fraternal groups. MAPL benefits from these partnerships by gaining access to the experience, community prestige and influence of full-time professional staffs with established funding sources.

Together, MAPL and its state and local preservation partners form a complimentary coalition for the advocacy of Modern preservation - monitoring, responding to, and initiating press coverage, attending local and statewide planning and preservation meetings, and speaking and writing to educate a variety of public and private forums about the history and value of Modern architecture.

Working with national partners, MAPL hopes to eliminate the fifty-year rule of the National Register of Historic Places. Buildings less than fifty years old can achieve listing if proven to have "exceptional" significance. But on a functional level, the fifty-year rule provides tacit sanction to redevelopment forces seeking to destroy important historic buildings less than fifty years old. It stands as a major barrier to Modern architectural preservation across the country.

MAPL also corresponds internationally, collecting and disseminating information about Modern preservation worldwide to lend authority to local efforts.

Adversarial Attitudes Toward the Preservation of Modern Architecture

In Denver, the ground rules for historic preservation were clear. If a building was of certain style or age, redevelopment interests could anticipate preservationist resistance. Any structures built later or designed in Modern styles could be disposed of with impunity. With MAPL's appearance, the rules changed. Still, a number of pernicious misconceptions about local Modernism continue to arise in virtually every preservation issue within MAPL's concerns. In some cases these misconceptions are the result of sincere misunderstanding. In most, they simply reveal the creation of a new, disingenuous vocabulary to rationalize the destruction of a whole new generation of historic buildings.

"It's Too New" The "newness" of Modernism often confounds those who had previously understood historic preservation only in terms of "old" buildings.

"It's Second Rate" Due to geographic isolation well into the twentieth century, Denver frequently lagged behind architectural trends. The resulting "small town" feelings of inadequacy are frequently exploited to promote demolition. Despite its design by luminary I.M Pei, Zeckendorf Plaza's location in Denver has been used to stigmatize it as a disposable, second-rate example of his work. In fact, Denver's architecture first began to develop concurrently with international trends beginning with the International Style. Ironically, others recognize I.M. Pei's unassailable international prestige and attempt to sever his name from the project in order to evade landmark status and expedite its destruction. Cynically misrepresenting the process of architectural design, they assert that Pei did not "really" design the complex because it was the work of a team of architects under his direction.

"It's Ugly" Some state that Modernism is stylistically inferior to highly ornamented

Victorian, Beaux Arts, Neo-Classical, and European historical revival styles and is therefore unworthy of preservation. This is surprising in Denver, where the most conservative observers venerate the local Spanish-American and Native-American architecture that shares Modernism's simplicity of form.

"It's Not Historic" For others, architecture is worthy of preservation only when it reflects Colorado's ranching, mining and "Cowboy and Indian" heritage. As a result, historic Modern buildings are increasingly being "Victorianized," frequently to provide tourists with a seamless experience of the "Old West." This is an indefensible position since the majority of Colorado's built environment dates from the twentieth century and is predominately Modern in style. Further, Colorado's premier tourist attraction is the 1954-65 International Style United States Air Force Academy by Skidmore, Owings and Merrill.

MAPL Strategies for Preserving Modern Architecture

During five years of existence, MAPL has identified and pursued a number of preservation strategies that have proven successful in varying degrees.

Protecting Modern Architecture in the Public Sector
The first major project in which MAPL was involved was the 1955 International Style Denver Public Library Central by Burnham Hoyt. Laughter initially greeted suggestions that the historic building be saved. But an active MAPL appearance at public meetings raised the specter of taxpayer dissent and contributed to the initiation of a civic process that resulted in the preservation of the building.

MAPL immediately identified publicly-owned Modern buildings as a primary opportunity for its preservation efforts. MAPL works to landmark and advocate the responsible public management of important, publicly-owned Modern buildings.

MAPL is alert to private sector attempts to compromise Modern public buildings for private gain. A local concert promoter successfully lobbied Denver Parks and Recreation to undertake a study of the expansion of seating at Burnham Hoyt's internationally recognized 1941 Red Rocks Amphitheater. The amphitheater, owned by the city, did not contain enough seats to satisfy revenue demands. The plan, denounced by the public and preservationists alike, was abandoned by the city after the promoter shifted business strategy and withdrew his request.

Unfortunately, MAPL efforts to protect state and federally-owned Modernism have failed miserably. Temple Buell considered the 1960 Formalist State Service Building, owned by the state of Colorado, his finest work. Despite the building's prominent location adjoining the Capitol Building and the Civic Center Historic District, the state destroyed the architectural integrity of the primary facade with an inappropriate entrance, apparently to provide outdoor shelter to employees banned from smoking indoors.

Temple Buell's 1940 Art Moderne Lincoln Park Projects was bulldozed to the ground by the federal Housing and Urban Development agency (HUD). One of the earliest WPA public housing projects in the nation, it had been determined eligible for National Register listing. Original plans called for the most commercially valuable portion of the site to be redeveloped for retail by private interests. Victorian revival replacement housing will be rebuilt on the rest of the site.

Protecting Modern Architecture in Historic Districts
When Denver's Civic Center was listed as a National Register Historic District, Modern buildings were categorized as non-contributing structures. Perhaps, then, it was inevitable that the 1955 Burnham Hoyt building was quickly deemed disposable when library officials began planning for expansion.

During the library controversy, officials also looked across the Civic Center at the site of another significant Modernist building, the former University of Denver (DU) Civic Center Classroom Building of 1949 by Smith, Hegner, and Moore, an austere, Bauhaus-related International Style structure. It, too, was classified as a non-contributing structure in the National Register Historic District. These buildings and a third Civic Center structure, the 1939 Art Deco State Capitol Annex, achieved individual National Register listing through MAPL nomination.

MAPL strategy continues to include a methodical review of existing city and National Register landmark districts, where important Modern buildings are frequently ignored or singled out as non-contributing structures. With a mini-

mum amount of additional research, writing and administrative work, they can be reclassified as historic, contributing district components.

In Denver, historic district status provides more effective protection against loss than individual landmark status. In recognition of this, the MAPL-prepared Denver landmark nomination of Zeckendorf Plaza seeks historic district status for the complex instead of individual listing of each structure and element.

Protecting Modern Architecture in the Private Sector
As urban areas struggle to retain retail and commercial revenues, projects traditionally funded and managed within the private sector are increasingly assisted by substantial taxpayer dollars and tax subsidies. This creates new dangers and new opportunities for preservation.

In Denver, the Urban Renewal Authority (DURA) has been charged with distributing millions in tax dollars to encourage downtown redevelopment. Historic preservation - how a project respects and enhances existing downtown building stock - is a key criteria in awarding these dollars.

Despite this, private redevelopment interests seeking DURA funds are currently denouncing the former May D&F retail block, an integral element of I.M. Pei's Zeckendorf Plaza, as obsolete. They are seeking millions in taxpayer funds for its destruction.

Blocks away, a short row of nineteenth century structures which survived the "urban renewal" that destroyed 250 surrounding buildings is a bright spot in Denver retail. This winter, merchants installed a temporary ice rink that lured still more shoppers to the district. At Zeckendorf Plaza, conceived as Denver's Rockefeller Center, a professional-class ice skating rink lies abandoned, fated for destruction in every redevelopment plan offered to date.

Admirably, DURA recently approved funding for the removal of a facade that had encased and destroyed the architectural integrity of the Beaux Arts American National Bank Building. Yet every plan seeking DURA redevelopment funds for Zeckendorf Plaza has called for a complete, "updated" resurfacing of the International Style former May D&F store block. This incongruity demonstrates again the role that stylistic prejudice plays in the destruction of Modern architecture.

Architectural losses in the private sector are inevitable when property owners fail to accord historic buildings their true economic value and demolish or remodel them into oblivion. But the expenditure of taxpayer dollars or the granting of tax subsidies to facilitate their destruction is squarely in the public domain and thus open to preservation influence. Working in combination with preservation partners, MAPL has been instrumental in monitoring public funding of private projects that threaten historic Modernism.

Landmarking Modern Architecture Prior to Threats
In 1990, despite concerted civic effort, J.J.B. Benedict's 1911 Central Bank was demolished by investors. In response, an outraged Denver City Council immediately amended the Landmark Ordinance to include a one-year period of good-faith negotiation between owners and the public prior to demolition of any building designated a Denver Landmark building. If demolition was to be approved, completed plans for a replacement structure were to be in hand. No longer were historic buildings to be demolished for indefinite use as surface parking so owners could "warehouse" the sites for undefined future redevelopment.

The first test of this new one-year demolition protection was Burnham Hoyt's 1939 International Style Boettcher School, owned by the Denver Public Schools and listed in the National Register of Historic Places for its exceptional architectural and historic importance. The City Council denied Boettcher School Denver Landmark status in order to facilitate its acquisition and demolition by neighboring Children's Hospital. It is now a parking lot.

Denver's landmark process is a political one. As in all political processes, landmark decisions are made behind closed doors long before the public hearings that are intended to dictate, or at least influence, their outcome. It is clear that only buildings not under threat of demolition can be designated as Denver Landmarks. Once a historic building is targeted for redevelopment, the landmark process cannot withstand the political pressure from public and private interests seeking to block landmark status and profit from the building's destruction.

MAPL observed that a methodical survey and evaluation process was necessary to identify and landmark historic Modern buildings on an ongoing basis, before they are threatened. During the struggle to preserve Boettcher

School, MAPL began a complete survey of the Denver Public Schools (DPS). MAPL released its formal survey document of Modernist elementary, middle and high schools when the DPS announced the possibility of building deaccessioning. This MAPL survey became a key source document when the DPS Historic Preservation Project was created to polish the district's reputation on preservation.

A broad group including preservationists, DPS employees, teachers, and parents worked to develop a history and civics program in which students research school history and prepare and present Denver Landmark nominations for their schools. Because it was a requirement that every child have equal access to the program, every school building in the system, regardless of its age or architectural style, instantly became landmark material. This program has proven a major vehicle for MAPL to advance the landmark listing of Modernism. Under the DPS Historic Preservation Program, Grant Middle School became the first International Style building to be listed as a Denver Landmark. A second International Style school, an Art Deco Style, and a Usonian Style school have also been listed through the program. Landmarking of other Modernist schools is underway.

Also in response to the Central Bank tragedy, a coalition was established by the city to develop a "comprehensive citywide preservation ordinance which provides for a balance between protection of our historic resources and economic incentives for their redevelopment." On the basis of the committee's recommendation, Denver's downtown, the B-5 Zone, was selected as a pilot area for survey, evaluation, and review and development of preservation strategies. The resulting plan was to guide the criteria for landmark designation and protection in the B-5 Zone, and, when complete, to serve as a model for preservation citywide.

A private firm was hired to update a 1984 survey of the B-5 Zone. Since that survey did not consider or include structures built after 1945, Denver Planning contacted MAPL, which donated survey materials on B-5 Modernism for inclusion in the new survey document. The outcome of the B-5 pilot program has been disappointing. Though MAPL achieved further recognition of Modern buildings downtown, the process rejected all but the oldest for serious consideration as historic structures. New downtown historic districts have been proposed based on the survey, but boundaries have been drawn that pointedly exclude important Modernism.

In the private sector, MAPL provided volunteer research and assistance to achieve Denver Landmark status for the 1955 residence designed by Joseph and Louise Marlow for MAPL members Suzanne and Lloyd Joshel. The Marlows' buildings were part of the most advanced current in world architecture of its day - the Minimalist variant of the International Style. In the 1970s, one of their finest buildings, the nearby 1949 Hobart Residence, was stripped to its structural members and completely reclad in a degraded, ersatz French Empire Style. This, along with the widespread appearance of "pop-tops" and "scrape-offs" in the Hilltop neighborhood, underscored the necessity of easement protection for the Denver Landmark Joshel Residence. A number of other MAPL members who own significant residences are currently preparing individual and district nominations for their Modernist homes and neighborhoods.

Expanding the Coalition for the Preservation of Modern Architecture

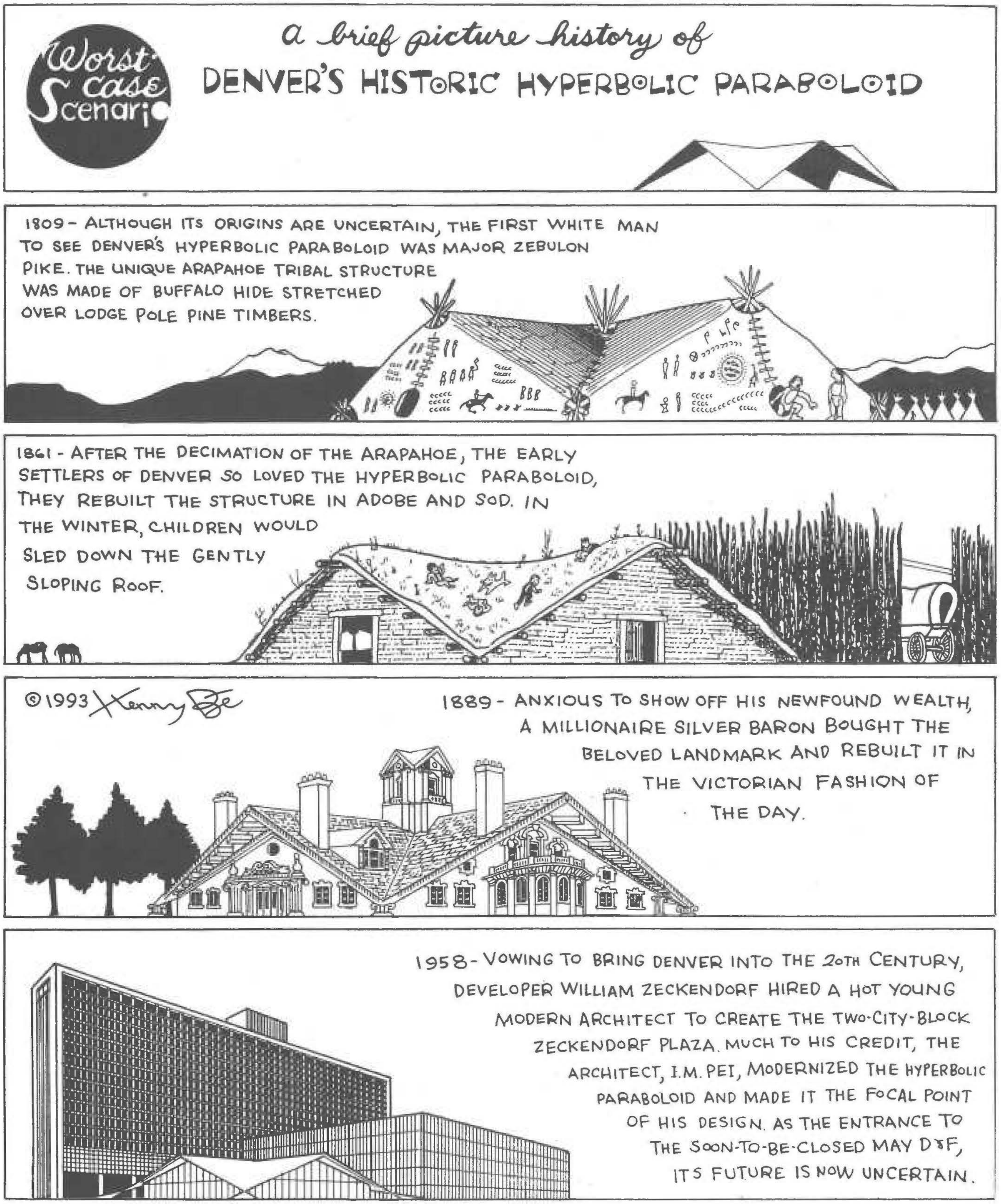
Another major MAPL goal is the expansion of the traditional base of preservation support. Many MAPL members are those professionally or personally involved in architecture, construction, antiques, decorative art, fine art, writing, publishing, interior design, graphic design, and industrial design. In all these fields, Modernism is a recognized historical fact.

Contrary to popular myth, Modernism also enjoys wide support from the general public. Modern architectural styles are frequently said to be cold, forbidding, overly intellectual, and resistant to human attachment. This myth has been repeatedly debunked during MAPL's five-year existence. During the struggle to preserve the library it was clear that the building summoned warm, emotional associations for a broad group of Denver citizens. Boettcher alumni spoke movingly on behalf of the school's preservation. Students and alumni have enthusiastically joined to achieve landmark status for their historic schools - even those designed in the most austere Modern styles. Broad support exists for the preservation of the hyperbolic-paraboloid skating rink, and all the elements of Zeckendorf Plaza that have served as a center of the city's public life for thirty-five years.

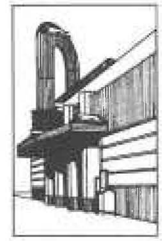
Recognizing new partners for historic preservation will be, ultimately, what determines its success or failure in the future. In Colorado, the

West is struggling to style itself anew for the twenty-first century. Underpopulation and lack of investment plague the cities. Overpopulation and overdevelopment destroy rural and natural areas. Natural resources dwindle as landfills grow to capacity. The fate and quality of the natural environment and the built environment are inextricably entwined. Only a broadly based, broadly defined, and ever expanding "preservation movement" can hope to save both for future generations.

Research, conceptual and editorial assistance provided by Michael Paglia and Rodd L. Wheaton.



Denver cartoonist Kenny Be challenged Denverites to confront their conceptions of architectural style and historical substance in this cartoon which originally appeared in Westword, April 14-20, 1993.



Saving the Suburban Sixties: Historic Preservation Planning in Fairfax County, Virginia

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Introduction

The notion of "historic preservation" in northern Virginia's Fairfax County - the most intensely developed jurisdiction in the Washington, DC, metropolitan area - often taxes one's credulity. Those familiar with the county but whose perceptions are of only gridlock and sprawl strain to remember what is left that is old, much less historic. They recall waggish bumper stickers that use Fairfax as a verb describing an act that should not be done to other nearby counties or, for that matter, to the rest of Virginia. Those less familiar with the county may have read what some observers have written about our "Edge Cities," "Beltway Bandits," and "McMansions."

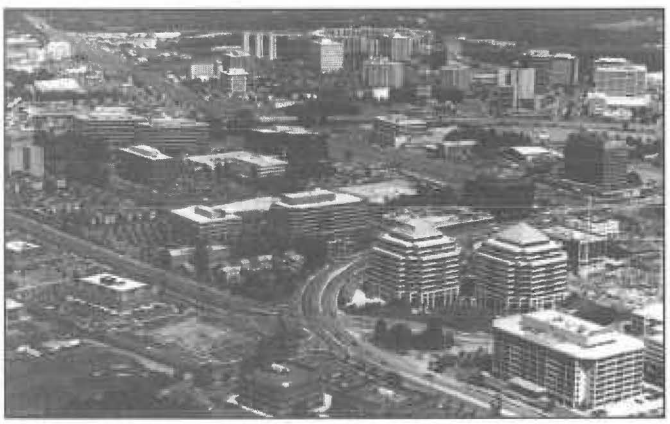
The history of Fairfax County can be captured in three "snapshots." The first shows a group of earnest Paleo-Indians ambushing a Wooly Mammoth at the crossing of two well-worn paths in the ice-age tundra. The second shows a graph of population change in the county since the first census in the 1790s. The population level was virtually flat until the 1930s, it doubled each decade from 1940 until 1980, and it doubled again over the past fourteen years to over 820,000 today - an average increase of eighty-eight percent per decade since World War II. The third is of Tysons Corner, a gas station and a general store as late as the 1960s, now the commercial hub of the county and the seventh largest business district in the country, with over twenty million square feet of office and retail space. Archaeologists might say that snapshots one and three depict the same spot and simply show the impact of the view shown in snapshot two on the past and present of a traditional crossroads trading center.

Of course there are venerable sites of historic and architectural significance in the county - Mount Vernon, Woodlawn Plantation, and Gunston Hall to name a few. There are also hundreds of lesser known eighteenth and nineteenth century historic sites scattered around the county, as well as more than two thousand recorded archaeological sites including one about eight thousand years old (properly excavated and recorded, of course) now under a parking structure in Tysons Corner. Collectively, these ably represent the heritage of the nation, state, and county.

Needless to say, these invaluable traces of the past - traditional history, if you will - have been the focus of the county's preservation planning program since the early 1960s. But, this is history to read about, not recall; to look at, not to have lived. About ten years ago, this dichotomy was recognized by those concerned with understanding and preserving the heritage resources of the county and questions were raised, traditions challenged, and goals debated.

Debate focused on defining the most historically significant periods in the history of Fairfax County. Prehistoric days that ended with the explorations of Captain John Smith and other Europeans? Days of the Royal Proprietor, Thomas, Sixth Lord Fairfax, when the lands that became the great plantations were granted, assembled, cleared, and cultivated? Patriot days when the county's two Georges, Washington and Mason, fathered a nation and its Bill of Rights? The days when westward expansion meant a scattering of wilderness homesteads ten or so miles upland from the Potomac? Or the days when Colonel John Singleton Mosby

Tysons Corner about 1940. (Photo courtesy of Fairfax County Public Library Photographic Archives)



Tysons Corner in the 1980s. (Photo courtesy of Fairfax County Public Library Photographic Archives)

provided many sleepless nights for Union occupying forces? All of these are significant times that affected tens, hundreds, and even thousands of people. But, the era that affected *hundreds of thousands* came after these.

The Beginnings of the Recent Past

In the late nineteenth century, economic and social woes affecting the nation and the ease of travel and communication throughout the country reduced the importance of state governments. By the turn of the century, the scale of the federal bureaucracy began to expand with the rise of new regulatory agencies and the expansionist foreign policy of the times. In the early twentieth century, the world view brought on by World War I and the "alphabet soup" response to the woes of the Depression caused Washington to become the hub as well as capital of the nation. Fifty years ago, World War II pushed a moribund military into the forefront of the bureaucracy and, in the heat of the Cold War, the military-industrial complex mushroomed, crossed the Potomac, and grew in the fields of Fairfax County.

In the late nineteenth and early twentieth centuries, Fairfax County was the dairy center of the United States and the breadbasket of the nation's capital. To accommodate these activi-

ties, the mud and gravel roads that once were only farm-to-market routes began to be traveled in both directions. Washington residents, particularly the upwardly mobile middle class, sought homes or weekend retreats way out west in the inexpensive, open countryside of McLean, Mount Vernon, Great Falls, and Fairfax City. Houses were added to tiny crossroads villages like Dunn-Loring, Langley, Vienna, and Clifton, while trolley lines grew along with public services and local commerce. This gentle infiltration began as Washington became an employment magnet. It became a great invasion as the city's population exploded from the "War to End All Wars" to the "War on Poverty," as tens and then hundreds of thousands of people made Fairfax County their home. In re-re-re-redoubling the population, they made another kind of history, not more or less significant than the past 250 or 10,000 years, but different and more challenging to identify, record, communicate, and, yes, preserve.

Identifying the Recent Past

In 1988, Fairfax County adopted its *Heritage Resources Management Plan*. This plan identified ten so-called study units beginning with the prehistoric Paleo-Indian cultures, the time of Hunter-Gatherers, and the beginnings of European contact. It then focused on the historical periods including those of the tobacco plantation society, free black communities, Civil War and Reconstruction, and agrarian culture. The latest of these study units is most relevant to the recent history of Fairfax County - that of suburbanization and urban dominance.

The plan described the cultural context of each study unit as well as the heritage resource types that typify the time or group. For the suburbanization unit, typical resources included horse farms and commercial agriculture, industrial parks and shopping centers, planned communities and crossroad clusters, trolley lines and paved highways, single-family housing and cooperative apartments, government offices and military installations, and schools and parks. A subcategory of the study unit, perhaps unique to northern Virginia, is "colonialization" - the design influence of Mount Vernon and, to a lesser extent, Williamsburg in both new construction and remodeling. Here, columns and cupolas were added to everything from nineteenth-century vernacular farmhouses to gas stations and high-rise office buildings. Architectural kitsch became architectural history as the visual character of much of the county was formed.

Not surprisingly, studying this part of the past bucks the traditional concerns of archaeologists, historians, and preservationists. Because of this, many of the resources identified in this unit had been unsung and unsaved. With the prodding of the *Heritage Resources Management Plan*, an awareness of the cultural significance of these properties has increased and they are now considered worthy of study and recording. Researchers have found that they are fun, too.

Recording the Recent Past

The Fairfax County Inventory of Historic Sites was begun in the 1960s and now includes nearly 300 properties. At least a fourth of these were built or remodeled in the twentieth century and include such niceties as Wright's Usonian Pope-Leighey House, built in 1940 and relocated in 1964; roadside attractions such as the 1950 Frozen Dairy Bar, now in architectural mothballs; shopping centers such as Seven Corners, opened in 1956, the first in the Washington metropolitan area; and planned communities such as Hollin Hills, 1949-1962, and Reston, begun in 1965.

The inventory is primarily that, a list of properties deemed to be of sufficient interest to be studied and recorded. Inventory properties are not protected, although over thirty are also listed in the National Register or included in local historic districts. They are, however, taken into consideration in the county's planning and zoning processes. There is also a parallel inventory for archaeological sites, now numbering over 2,000, but only a handful of these relate primarily to twentieth-century resources.

An example of the type of recording of the recent past that is taking place in Fairfax County is the photographic survey of the planned community of Hollin Hills. Begun in 1949 and completed in the 1960s, this single-family housing project was singled out as a "milestone in the future of American architecture" in the 1957 centennial exhibit of the American Institute of Architects. Its houses designed by the late Charles M. Goodman, came in fourteen "basic" types. Buyers could make individual modifications within the context of the architectural design and the parklike landscape, a new concept that bridged the gap between custom and cookie-cutter design. The purpose of this photographic recording project, undertaken by students of the urban architecture program of

Virginia Polytechnic and State University (Alexandria Center), recorded all the basic themes and variations. This has sparked an interest in studying other works by this well-known Washington area architect as well as an interest in contemporary, as opposed to traditional (read "colonialized"), design in the county.

Communicating the Recent Past
In addition to sponsoring the work of others, such as the Hollin Hills survey, Fairfax County has a growing interest in publishing materials relative to recent history. *The Fairfax Chronicles*, the county's newsletter devoted to archaeology, history, architecture, and historic preservation, has been published for the past sixteen years. Within the past four or five years, more and more articles and photographs about the early and mid-twentieth century have been included. These are extremely popular with the public, particularly school children. An article and twilight color photograph of the neon-lighted Frozen Dairy Bar stirred up much nostalgia as did a recent article on the thirtieth anniversary of the opening of the Capital Beltway, the circumferential highway serving the Washington metropolitan area. In that issue, early aerial and ground photographs were printed side by side with increasingly more cluttered street maps to tell the story of post-World War II development in Fairfax County in a way that both long time residents and newcomers could understand. It was history they could touch, and laugh at. The cover photograph showed the brand new Beltway bumper-to-bumper with the parked automobiles of those who came to witness its grand opening in 1964. It hasn't changed much since.

One of the more popular communications devices sponsored by the county, in conjunction with the Virginia Department of Historic Resources, is a highway marker program. These are the roadside markers that you try to read as you drive past (new ones are now placed at intersections or at convenient pull-offs) that tell who lived, fought, or otherwise did something of historical interest at that place. The three latest markers in the county deal with the outer defenses of Washington, but not during the Civil War or War of 1812. Rather, these tell about the three Nike anti-aircraft missile launching sites located in the county during the hot days of the Cold War. These were well-guarded secrets until phased out in the 1960s, except for the fully-equipped one used as a tour site to impress on foreign dignitaries that America did, indeed, carry a big stick. Now they are grassy spots in public parks, but with a history as important as the line of fortifications that ringed Washington on the Virginia side of the Potomac one hundred years earlier. Both sets of fortifications were more psychological deterrents than actual ones, and none ever fired a shot in anger.

Preserving the Recent Past
Like the forts and launching sites of past eras, Fairfax County has the latest arsenal of historic preservation tools at its disposal. These include thirteen Historic Overlay Districts officially designated by the Board of Supervisors and subject to design review as part of the county's Zoning Ordinance. Because of the architectural traditions and development patterns of the county, none of these include the uniformly old urban neighborhoods that are typical of historic districts throughout the country. Rather, most Fairfax County districts focus on a single primary structure—the Pohick Church of 1769, or the 1794 Sully and 1806 Woodlawn Plantations. An essential part of these districts, if not the key, is the larger landscape context that defines approaches to the primary, or core, properties as well as views to and from them.

A few of the county's historic districts are more traditional building clusters, the least traditional of which is the Lake Anne Village Center of Reston. This residential/commercial complex was built in 1965 and formally designated as a Fairfax County Historic Overlay District in 1983. To my knowledge, this is the only designated historic district in the country subject to local design review where every bit was built in the *1960s*.

Fitting right into the theme of suburbanization and urban dominance, Reston occupies the former seven thousand-acre Bowman Farm, which by the mid-twentieth century was the largest single tract of land in the area. The Bowmans had tried to develop a new town themselves, but eventually sold the land to Robert E. Simon. In 1961, he began to plan, build, and market Reston, and to use his initials in the name. Ironically, this had been the site of another planned town in the 1890s with the less catchy name of Wiehle, which never grew to more than a handful of buildings.

Unlike Wiehle, Reston, home now to over 60,000 people, was phenomenally successful. From the beginning, critics hailed Reston's concept of village centers surrounded by greenbelts as a

Hollin Hills in the 1950s. (Photo courtesy of Fairfax County Public Library Photographic Archives)

Lake Anne Village Center, Reston, 1977. (Photo courtesy of Fairfax County Public Library Photographic Archives)

significant planning and architectural achievement. Lake Anne Village Center, designed by the New York firm of Whittlesey and Conklin, was the first of the village centers built and was designed at a pedestrian scale with a mix of residences, offices, and retail stores gathered around lakes and plazas, urban spaces in the suburbs. As a 1981 *Washington Post* article observed, "No piece of Northern Virginia real estate was more praised and honored in the 1960s than Reston's Lake Anne Center."

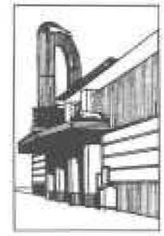
The center was designed and built as a whole with each element fitting into the entire scheme. Buildings ranging in height from two to four stories line the lake and plaza while one eighteen-story apartment building stands as a focal point at the end of the plaza. A "J" shaped row of shops topped by apartments encloses the wide plaza and crowns the northern tip of the lake. The buildings share a common vocabulary of design and materials; the modern, straight-edged architecture is executed in medium brown brick with dark brown wood trim, gray concrete, and glass. The buildings are complex compositions of solid and void, with many balconies, sheer brick walls, flat but varied rooflines, and expanses of glass. Concrete sculpture and, today, mature landscaping accent the plaza where moms with strollers enjoy the human scale.

As with the more traditional of Fairfax County's Historic Overlay Districts, the goal is to protect the architectural and environmental fabric of the center and to assure that future development is compatible with its existing architectural character. For the Lake Anne Village Center, this is not as easy as it sounds. These mixed use buildings were products of the 1960s, and designed to meet contemporary needs with the technologies of the times. As such, they are essentially speculative commercial buildings designed and constructed to last around thirty years. Today, thirty years later, parts are wearing out, pieces falling off, and buildings built before energy was a problem and big-box stores were the competition present challenges to preservation-minded owners and to the county's Architectural Review Board. Working with Reston's own Design Review Board while projects are still on the drawing boards has smoothed this process significantly.

Challenges to Preserving the Recent Past

Aside from the technical challenges of preserving an architectural fabric that was never intended for anything near posterity, the biggest challenge to preserving the recent past of Fairfax County is overcoming the notion that it just isn't past enough. The "fifty-year threshold" has not been crossed, and we are dealing with architectural nostalgia, not architectural history. This, however, is a purist, not populist, argument. A browse through any of today's "Antiques and Collectibles" shops where Fiesta Ware, Tonka trucks, and chrome-plated dinette sets command premium prices reflects the growing public fascination with the recent past. But, what of this past is significant enough right now to warrant public respect and scholarly interest?

In Fairfax County, as in any other suburban jurisdiction, the answers fall along a sliding scale. To us, however, all evidence of the recent past is significant because of what it can teach us about where *we*, not just our parents or grandparents, have come from and how we have coped, for better or for worse, with the opportunities, needs, and constraints of geometric growth. That is why we are sifting through what is left of the resources of the recent past, some to merely note, some to celebrate, some to preserve, and all to respect. Would that our parents and grandparents had done the same.



Scholarship, Strategy, and Activism in Preserving the Recent Past

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Several years ago in her article "Yuppies, Bubbas, and the Politics of Culture," Catherine Bishir warned about a serious communication gap that can develop between preservation professionals and the general public. Everyday citizens may sometimes view the concerns of preservation professionals, especially the sorts of concerns that are academically-derived, as nonsensical esoterica, the work of Mandarin elitists who have nothing better to do than to frustrate hard-working citizens who want to put some vinyl siding on their houses.[1] This warning is particularly apt as we consider the challenge of saving important buildings from the recent past, especially the kinds of commercial buildings that are widely regarded as expendable. If certain buildings of this description appear to us to have sufficient importance to merit preservation campaigns, then how can such campaigns be waged successfully? How can skeptical reactions among the general public be overcome? How can support be created for the retention of buildings that seem to defy common standards for defining "historic resources"? In short, how can we make our case without coming across as purveyors of weirdness?

As both an academician and a preservation activist, I would like to suggest some approaches to this challenge that may help to establish a bond among scholars, activists, and the general public on behalf of preserving significant historic resources from the recent past. While acknowledging the tensions that can sometimes exist between the intellectual culture of the preservation movement and the other subcultures in American life, I am going to try to identify three major cultural tendencies that are shared to some degree among preservationists and the general public, tendencies that have particular importance - for better and also for worse - in our challenge of preserving the recent past.

The first of these tendencies is the proclivity for allowing our personal taste in architecture to outweigh more legitimate criteria for determining the historic significance of buildings. This is a cultural tendency that affects preservation for the worse, and it is shared, unfortunately, by members of the general public and members of the preservation movement. Whether it takes the form of a "high-brow" aspiration to connoisseurship or the impulse within mass-culture to remain "in fashion," most of us have strong opinions with respect to the way things look, and this perfectly normal human tendency can have extremely negative effects upon historic preservation, depending on circumstances. In the case of significant buildings from the recent past, the aesthetic issues are especially fraught with negative feelings. To put the matter bluntly, buildings from the recent past are highly vulnerable to aesthetic ridicule. Not old enough to be regarded as venerable or even quaint, such buildings are frequently regarded as awkward and obsolete: as examples of the funny bad taste that prevailed the day before yesterday. Try to save almost any commercial vernacular building from the past few decades and almost immediately - in reactions from public officials, editorial writers, and the general public - you will hear derisive objections that the building in question is "ugly," or is simply "junk." Again, the problem of taste prejudice as a hindrance to assessing the historic significance of buildings from the recent past is pervasive not

only in the general culture but in preservation culture as well. Indeed, the members of the general public who behave in this fashion may well be encouraged by cues that they are picking up from the preservation movement.

In considering the history of American preservationism from its origins in the early nineteenth century to the present time, it is striking to observe the degree to which preservation continues to be driven to an overwhelming extent by aesthetic issues. Our movement is supposed to be a movement for historic preservation (and certainly the National Register program is grounded in historical analysis) but many preservationists continue to behave as though the movement were a war of taste. It is not at all unusual to encounter preservation veterans and even scholars in architectural history who testify in public hearings against the preservation of buildings they regard as "bad architecture."

This tendency is exacerbated by a methodological convention that is near-pervasive, even among preservationists who would never dream of cheering on a wrecking crew. Richard Longstreth has criticized the tradition within the preservation movement of separating the attributes of historic resources that are said to possess purely "architectural" significance from the attributes that are said to possess purely "historical" significance.[2] I agree with Longstreth that this is an insidious practice because I cannot accept the view that architecture and history are metaphysically separate realms. It seems to me self-evident that architecture, like everything else within human experience of which we have a record, constitutes a part of history, not a separate realm that exists outside of "history." The history of design is intimately connected to the history of patrons and builders and users and communities and culture. But instead of emphasizing the interconnectedness of the building arts and society, we separate "architecture" and "history" and proceed to the further separation and isolation of the ornamental aspects of architecture in our mania for classifying so-called architectural "styles." These tendencies have gradually created a preservation culture increasingly preoccupied with the determination of which historic buildings are "pure" examples of a "style," or constitute "the best" examples of a "style," or seem to be the first or most elaborate examples of a "style," or whether particular historic buildings exemplify what architects and critics regard as an urbanistically "valid" style. In light of all this, is it really surprising to encounter a conscious or unconscious presumption by the general public, as well as by elected and appointed decision makers, that the people most qualified to render professional opinions regarding the significance of historic buildings are architects - that architects, even more than historians, are the people best qualified to judge how "good" a historic building may be as an example of a "style," or whether the "style" of the building represents a "good" style or a style that has been discredited by reputable designers? Buildings from the recent past are especially vulnerable to the intellectual and cultural trends that I have just been describing.

Ours is a movement for historic preservation, and unless we constantly re-emphasize the role of historic buildings as social and cultural documents, we will fail to save significant buildings whose "style" is temporarily out of favor, and significant buildings from the recent past are aesthetically out of favor as often as not. We need to remind ourselves, and then remind the general public, that some of the historic buildings we treasure today were once almost universally condemned as visual monstrosities. This is one of the lessons pertaining to "style" that we need to emphasize, in order to counteract the cycles of antipathy that generate revulsion toward buildings from the recent past. My tactical recommendation: whenever you encounter taste prejudice in casework pertaining to buildings from the recent past, display some magnificent color photographs or slides of treasured Victorian buildings such as the Smithsonian Castle and then startle your audience by reading a few choice samples of the kind of vituperation that was once heaped upon such buildings by eminent theorists, critics, and wits. The response will often be a nervous laugh of the kind that establishes a bond between preservationists and their audience - a bond that is based upon a common recognition of human foibles, of the ironies of history and fickle caprices of fashion. While no preservation strategy is successful on every occasion, this method for dealing with the problem of taste prejudice will generally achieve good results if it is handled with the right kind of humor.

The second of the tendencies shared among preservationists and the general public is the positive flip-side of the tendency that I have just critiqued: namely, the tendency to indulge in aesthetic affinities that can sometimes lead to a

richer understanding of history in the broadest sense and which are therefore helpful to the cause of preservation and the recent past. I refer to cultural revivalism and nostalgia. For obvious personal reasons, most of us enjoy regaling ourselves from time to time with the artifacts of our lives in the 1950s, 1960s, and 1970s. We have a personal love-hate affair with the recent past; its artifacts in many cases may strike us as "tacky," but some of them are wonderfully tacky. They generate memory-associations that are "camp," and they provide us with a Proustian savor of things past. Of course there are obvious dangers for scholarly endeavor if nostalgia is allowed to run wild: specifically, the trivialization or exaggeration of the past through enthusiastic excess. And yet all historical scholarship involves some degrees of selection, emphasis, and commentary. If channelled responsibly, the currents of affection that we and the general public may feel for certain aspects of the recent past may help us to establish some significant links to recent buildings that deserve to be saved.

Consider a newspaper account of a restaurant in a suburb of Washington, DC, a restaurant whose owner improvised a new way to drum up business on Saturday nights.[3] According to this press account, "to get some life into his business and bring people to what he calls 'the shopping center from hell,'" the restauranteur turned Saturday nights into "Cruising Nights" in which, on average, "1,500 locals...cruise by...to admire classic American cars that their owners are eager to show off." The article included interviews with people like "Germantown resident Charles Posten" who "brought out his 1954 cherry red Ford pickup, with a rounded cab and running boards," and of "Andrea Golden, a North Potomac resident," who "told her 3-year-old son Brandon that the turquoise Ford Thunderbird convertible was 'part of history.'" Along with the cars, the owner brought in a disc jockey to play golden oldies from the 1950s.

So far as I know, there has never been any campaign to preserve this particular "shopping center from hell." But the case is suggestive, for reasons that should be rather obvious. If we find ourselves confronting the challenge of preserving a rare and unaltered example of a 1950s or 1960s shopping center, would a call to the local collectors of classic Corvettes or Mustangs be out of the question? If members of the public are conditioned through personal proclivities and cultural trends to ignore or despise the architectural evidence of 1950s or 1960s commercial culture, perhaps their affinities (some of which are culturally conditioned as well) for the musical and vehicular evidence of that same commercial mass-culture (golden oldies and vintage "wheels") can be used to prompt another look at the architectural setting for the vintage car show, a setting that is just as much a "part of history" as turquoise T-Birds. When it comes to activities like classic car restorations or Civil War re-enactments, Americans are extremely interested in history, and they can be very committed - to the point of outright fanaticism - to the principle of "historical authenticity" in their activities of re-enactment or restoration. Preservationists in general should give more thought to the potential of this cultural phenomenon and to the opportunity that it offers us if we can direct it to the built environment.

And now for the third and final cultural link between preservationists and the general public: a strange resistance to the concept of viewing the everyday content of our own lives in historical terms. On a certain level, of course, every sane individual is forced for obvious reasons to distinguish "the past" from "the present." But on another level, we are also aware that history is a continuum that flows without interruption into the present instant and the future. We are all very conscious from time to time of witnessing "history in the making" - at inaugurations of Presidents, at moments of national triumph or disaster. This is history with a capital "H," history on the grand scale. History of this variety has provided much of the grist for American preservation efforts from the nineteenth century through the present. It deserves to be noted that even in the nineteenth century preservationists fought to save buildings that were not very old at the time that they were saved - buildings such as Andrew Jackson's Hermitage in Tennessee and Abraham Lincoln's home in Springfield, Illinois. But while we recognize history on the grand scale at the very instant we perceive it unfolding on the television screen, we are generally disinclined through mental habituation to regard the humdrum parts of our lives in a historical dimension. Why should this be so?

Many of us in the preservation world in some way participate in the study of social history: the historical analysis of everyday social realities, including the humdrum social realities. So why should it seem to take a moment of unusual

or heightened awareness - why should it take the unconventional wisdom of theorists like Chester Liebs - to persuade us to view our everyday world as a "part of history"? Unless I am very mistaken, we are not very often inclined to think about our everyday world in this way, and we share this habit with the general public - with the people whose incredulous reactions to attempts to save significant buildings from the recent past are crystallized at the moment they ask themselves the question, "How can it be 'historic' when I can remember when it was built?"

Because so many people can not regard buildings constructed within their own lifetimes as palpably "historic" (in the same sense that they remember precisely where they were and what they were doing when they heard the news of Pearl Harbor over the radio, and their lives thereby intersected the process of history on the grand scale), the gloomiest predictions regarding the extinction of certain twentieth-century building types may be coming true. In the case of at least some types of commercial buildings, the precursors of centuries ago are now more plentiful than mid-twentieth-century examples.

But this painful fact of attrition and near extinction for certain types of twentieth-century buildings may enable us to sound the alarm even more effectively as preservation advocates. Human nature responds to superlatives such as rarity. And we can use this attribute of rarity to great advantage in campaigns to save important buildings from the recent past. But to do this most effectively, we have to instill in the public a powerful conviction that must first be instilled, or reinforced, in the ranks of preservationists themselves: the conviction that history is all-encompassing, that buildings from the recent past are part of our generation's history, and that if too many of them vanish, then some crucial evidence of our legacy will be gone. We need to save important buildings from the recent past for a fundamental human reason: so the evidence of social and cultural history from the late twentieth century will not be a ravaged or a missing presence in the built environment, or - in everyday terms - so that we can teach our kids what things were like in our own times. This is a message that people from all walks of life can understand because it is real to them. It establishes a bond between historic preservation, the serious study of history, and the lives of all Americans.

It is the vigorous invocation of history - of heritage - that constitutes the best, the most honest, and in general the most effective strategy for saving buildings from the recent past. I am tempted to conclude by adapting to my purposes the slogan concocted by the Clinton campaign in the 1992 election - "It's the economy, stupid" - but I will not conclude with a reminder that "It's the heritage, stupid" because preservationists are not really stupid and the general public is not really stupid either when it comes to these matters. We are just sometimes myopic with respect to certain issues relating to the recent past and its history. We are sometimes beguiled by habits of thinking that derive from the quirks of our culture. Our challenge today is to bring to public focus a truth that may often get shoved to the back of people's minds because they fear it is only a cliche: the truth that we are very much in the process of history, that we are making the historical process at every moment. With luck, in this conference, we are making a special kind of history now.

Notes

[1] Catherine W. Bishir, "Yuppies, Bubbas, and the Politics of Culture," *Perspectives in Vernacular Architecture* 3 (Vernacular Architecture Forum, 1989): 8-15.

[2] Richard Longstreth, "Taste Versus History," *Historic Preservation Forum* 8, no. 3 (National Trust for Historic Preservation, May-June 1994): 40-45.

[3] Steven J. Slater, "Cruisin': Restauranteur Uses Classic Automobiles to Attract Attention," *Montgomery Journal* (Montgomery County, Maryland, May 16, 1994): A-1, A-9.

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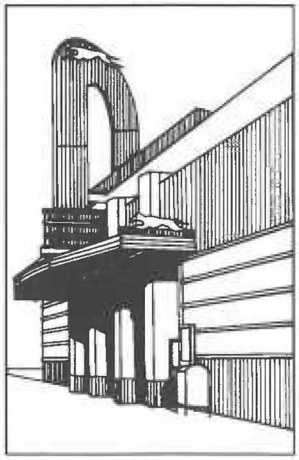
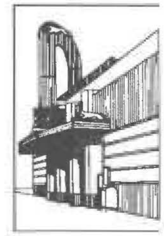


Industrial-Strength Solutions

Rehabilitation Option for the Warehouse Retailer, *Jack S. Frank*

Design Challenges of the Citadel, *O. Randolph Jones*



Rehabilitation Option for the Warehouse Retailer

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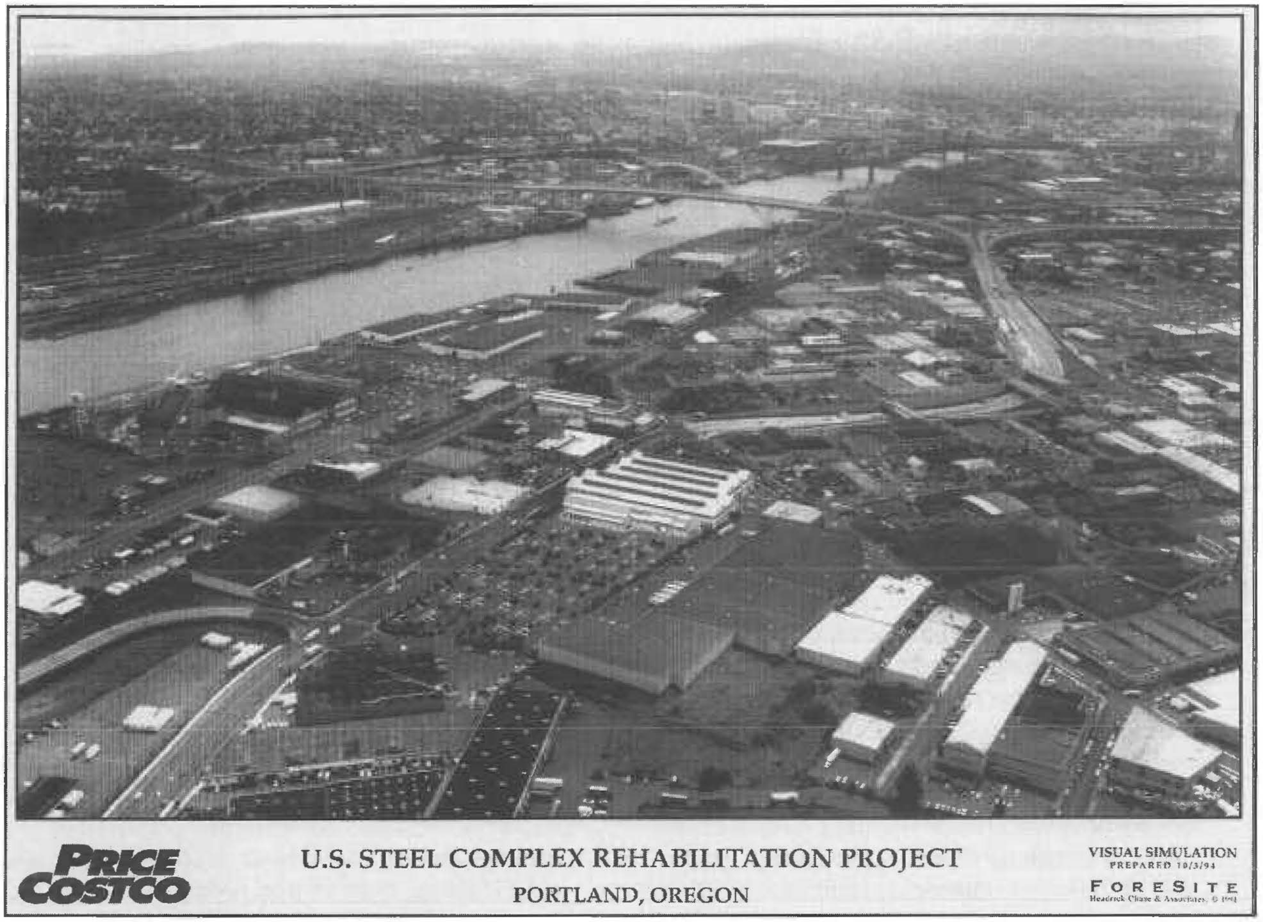
In an effort to revitalize the urban core, curb suburban sprawl, and protect urban growth boundaries, cities must find a way to encourage diversity of land uses that provide much-needed services to support and contribute to their vitality. There is no doubt that adaptive reuse and infill development are smart land use policies. When the warehouse retailer attempts to locate a facility in a major metropolitan urban area, the challenges of scarcity of land, soils and groundwater contamination, difficult and oftentimes outdated land use regulations, and the high price of property are often encountered. The primary customer base for a wholesale club, one form of warehouse retailing, is small business. Through membership programs, wholesale clubs know where customer trips originate and have learned that the urban core in many metropolitan areas is severely under-served by this type of value-shopping opportunity.

For the warehouse retailer, flexibility and creativity are two of the keys to unlocking the difficult inner-city development process. In Portland, Oregon, for example, PriceCostco is pursuing approvals to adaptively reuse the historically significant US Steel warehouse and distribution facility constructed in 1927. The goal was to create a profitable warehouse that would bring new vitality to the inner-city Guilds Lake Industrial Area while retaining the historical character of the US Steel site. The US Steel building, which has remained nearly vacant and grossly under-utilized for almost thirty years, lends itself beautifully to an unforced adaptive reuse. Not only will the building be saved, but also upgraded to current energy code compliance. Building code and accessibility standards can be met, and seismic upgrades can be accomplished relatively easily. Working with local historians, historic preservation architects, the Portland Landmarks Commission, and the State Historic Preservation Office, PriceCostco has created an innovative design that allows for minimal impact to the existing warehouse. With a 19,000 square foot addition on what was previously the rear of the building, the three primary elevations are virtually untouched. Through the appropriate use of color, materials, and detailing, the addition is compatible with and pays deference to the US Steel main structure.

The adaptive reuse of the historic US Steelworks facility is a rare opportunity. The rehabilitation can be accomplished with veritable ease, saving the building from the wrecking ball and protecting a part of Portland's industrial heritage. By locating a warehouse retail facility in the urban core, the economic viability of the City is enhanced through good jobs and good wages; industrial neighbors and nearby residents can take advantage of the convenience, minimizing automobile trips to the suburbs, which improves air quality, and efforts to create a livable city are reinforced.



Close to downtown Portland, the proposed Costco takes advantage of the same feature that makes this industrial area a good distribution center: easy access to the state highway transportation network.

In a creative and adaptive way, the proposed addition respects and pays deference to the historic structure and preserves an important part of Portland's industrial heritage.

On the edge of the industrial sanctuary, the proposed Costco provides a gateway into the Industrial District while preserving and enhancing the character of the area.

Design Challenges of The Citadel

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Adolph Schleicher built a fantasy in a land of fantasy, a 1929 temple of tires. In a Los Angeles infatuated with movies and automobiles, he built an Assyrian fortress for his Sampson Tire and Rubber Company. Outlandishly unique, it was right in style. Los Angeles of the 1920s was comfortable with Mayan-style movie theaters, Egyptian-motif apartment buildings, French chateaux and English cottages. Other tire manufacturing plants were clothed in Mediterranean or Mission Revival styles (Figure 1).

In 1978, the factory closed. Use became disuse; disuse became abuse; and the City of Commerce was in danger of losing one of its most unusual artifacts. In 1986, the Los Angeles office of the Trammell Crow Company, a development firm, and a Los Angeles architectural firm, The Nadel Partnership, won a city-sponsored redevelopment competition. Events were set in motion that ultimately transformed a relic into an exceptional, viable mixed-use project: The Citadel.

Design challenges were numerous. The ever-present market sensibilities of the Trammell Crow Company provided economic guidelines necessary for the financial success of the project. Like many projects, budget constraints were severe. The following is a chronicle of those challenges unique to The Citadel. These were concentrated in three major areas: land use and planning, incorporation of the icon, and rehabilitation.

Land Use and Planning

It was immediately clear to all parties involved in the project that the Citadel represented a special opportunity. It was a chance to preserve a rare landmark recognized by millions. Through adaptive reuse, an irreplaceable monument could be saved and a piece of Los Angeles preserved as living history.

Determining land uses for the restored facility presented many challenges. The site is situated in an industrial neighborhood, with a large pipe factory immediately to the north. Its location adjacent to a major freeway provides access to metropolitan Los Angeles and excellent visibility, but also freeway noise and proximity to an area considered to be high in crime. By typical development standards, it did not seem suitable for a pedestrian-oriented project.

As its only landmark, the City of Commerce wanted to make the most of the project. They sought preservation, land uses that could provide activity both day and night, and a hotel with banquet facilities for up to 600 people. A key to the success of the project was the decision by Trammell Crow Company to include a retail outlet mall. Historically, it fit into the industrial character of the neighborhood and the original factory. Because no outlet centers existed in Los Angeles, a large market was readily available. It provided the day and night activity sought by the city, but was not a threat to the original frontage wall of the historic complex. Prospective tenants specifically did not want the individual exposure usually sought by retail tenants. Signage for the retail center as a whole was sufficient.

The hotel was provided by a subsidiary of the Trammell Crow Company, Wyndham Hotels. They built a courtyard hotel with banquet facilities that satisfied the city's request. Office space completed the diverse mix of land uses. In order to attract a variety of tenants, different

sizes and types of office buildings were provided, including the upper floors of the historic administration building.

Planning of the site presented other challenges. The first and most obvious of those was the historic frontage wall and administration building. The concrete wall stretches for over 1,700 feet, is 26 feet high, and completely masks the interior of the site. The six-story administration building, only forty feet deep, acted as a "stage-set." From a developer's standpoint, they threatened to conceal this one hundred million dollar project.

Both the wall and administration building were quite well known in southern California. Nicknamed the "Babylonian Fortress" or the "Castle," they provided a major asset for the project: instant public recognition. It was clear that the uniqueness and recognition of the wall and building offered major advantages to the site and that they needed to be incorporated into the overall design. The question was how?

Research by The Nadel Partnership into Assyrian architecture revealed a relevant principle that ultimately dominated Citadel planning. Rather than a series of freestanding buildings, Assyrian cities were based on outdoor rooms. Buildings were designed and built to define outdoor urban spaces rather than themselves. These rooms or plazas provided community spaces, ventilation, and common circulation for the entire complex. Fortified walls surrounded the community (Figure 2).

The concept of outdoor rooms offered great potential to the project. It reinforced the sense of place, already established by the existing frontage wall and administration building. Without background or foreground buildings, the open-air spaces provided cohesiveness to the whole organization. Their self-containment provided a means of inserting a pedestrian-oriented project into an industrial neighborhood and simultaneously facilitated project security. The name "Citadel," a fortress within a city, came from the self-containment provided by the outdoor rooms.

The site plan was designed to gather all the enclosed spaces, except the hotel, around two major outdoor rooms: the grand allée and the retail mall. The grand allée extends 800 feet north from the existing frontage wall. One hundred-fifty feet wide, it is a formal space defined by office buildings, rows of palm trees and pedestrian paving. It is both the major north-south axis of the thirty-five-acre project and its major organizing element. The retail mall space is an informal space, with forced perspectives, colorful arcades and small-scale plazas. It anchors the site plan's east-west secondary axis, which bisects the allée, passes between the two-story office buildings and terminates at the hotel. The mall's flexible central space is the site of popular city events such as a farmers' market and auto shows. Around these outdoor rooms, large areas of landscaped parking act as a buffer to the surrounding industrial neighborhood. With assets densely grouped together and surrounded by parking, the proejct became an urban village. It is not unlike successful theme parks planned by Disney (Figure 3).

The outdoor-room concept did not accommodate vehicular circulation. A major concern was how to get automobiles from the frontage road through the existing concrete frontage wall and into the project. The project as a whole needed a front door. Additional access could be provided, at the east and west ends of the project, but it could not be made apparent to first-time visitors.

To provide for this main entry, a single section of the wall was removed: a section immediately east of the administration building extending to a terminating pair of existing pilasters. The administration building, anchoring one end of the opening, thus articulates or announces the entry. This opening provides much more than access for automobiles. It establishes the major north/south axis of the project and the location of the grand allée.

The grand allée, although a major vehicular entrance, was always considered to be a pedestrian space. Unlike the freeway scale of the existing frontage wall, the grand allée was deliberately detailed to a pedestrian scale through appropriate paving, landscaping and site details. Vehicles are allowed, but they are visitors in a pedestrian space.

Incorporation of the Icon

A major design challenge involved the incorporation into a single project of two very different architectural vocabularies. On the one hand, the original complex was a factory. It produced tires. Throughout most of the original buildings, a utilitarian, industrial vocabulary was dominant. On the other hand, the frontage wall and original administration building incorporated a

Figure 1. Original administration building with incised winged genii and royal figure. (Photo courtesy of City of Commerce)

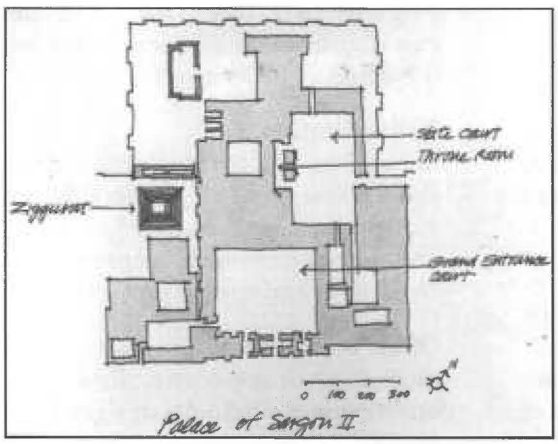

Figure 2. Plan of the Palace of Sargon II, Khorsabad, 720 BC. (Photo courtesy of The Nadel Partnership)

unique combination of Assyrian Revival motifs. These elements give the complex its unusual identity and high level of recognition among southern Californians.

The original selection of Assyrian motifs was not the result of whim or fancy. According to preservation architect Martin Weil, the name of the original tire company, Sampson Tire and Rubber Company, was chosen to suggest strength and endurance. The tires were implied to be as strong as Sampson.[1] The architects of the original complex were thus seeking a style of architecture that would incorporate the symbolism of Sampson. At the time, little was known about the architecture of biblical Israel. The next best choice was the architecture of Assyria. Few would have understood the distinction between ancient Assyria and Israel, yet the symbolism was strong, according to Weil. The original architects, Morgan, Walls and Clements, did not simply copy an Assyrian complex. They utilized elements that have been traced by Martin Weil to three Assyrian cities. The result of this synthesis was described by Weil as a "twentieth-century building in the Assyrian manner."[2]

The first challenge of icon incorporation was to provide movement through it, the experience of passing through the Assyrian Revival perimeter. In the original design of the tire plant, the Assyrian elements were two-dimensional. They had 1,700 feet of length, six stories of maximum height, but relatively little depth. Inside the Assyrian Revival perimeter, the industrial vocabulary was dominant.

One design goal was to extend the experience of an Assyrian spirit throughout more of the project. To provide cohesiveness and depth, the

stark discontinuity between the Assyrian and the industrial vocabularies was to be mediated but without imitation or weakening of the original image.

The grand allée, an outdoor room designed by Martha Schwartz of Schwartz, Smith, Meyer, significantly extends the Assyrian spirit of the original tire plant. It is in plan what the fortified walls are in elevation: strong and dominant. It incorporates plant materials that would have been at home in Assyria, placed in a regimented, almost militaristic way, to capture visitors and carefully control their movement through this processional space (Figure 4).

Surrounding the grand allée are four office buildings designed by The Nadel Partnership. To preserve the image of the original complex, they are all low enough to be hidden from any freeway view over the frontage wall. They incorporate abstractions, or stylistic clues, from the 1929 Assyrian Revival elements. These include abstract concrete pilasters, repeated vertical articulation and dominant entrances. As with the grand allee, the goal was to reinforce the Assyrian Revival characteristics. Colors for the buildings are derived from those used on the restored frontage wall.

An equally strong design goal was the preservation of the strong industrial quality of both the original factory and the neighborhood. The original factory consisted primarily of delicate sixty-foot steel trusses. Each was composed of a pair of thirty-foot trusses joined together to span sixty feet. The trusses were composed of small steel angles riveted together. Their configuration resulted in a sawtooth roof, allowing north light into the interior through clerestory windows. On top of the trusses was a wooden roof, composed of three-by-eight inch tongue-and-groove lumber. A design goal became the preservation of these trusses, as well as the spirit of the industrial vocabulary, to contrast with the Assyrian Revival elements.

The outlet mall, designed by Fernando Vazquez of Sussman/Prejza & Company, became the primary vehicle for the incorporation of an industrial vocabulary. Trusses were used behind the administration building, in their original locations, to cover an open air food court. A center section of roof was removed to provide a view of the historic Assyrian Revival administration building. Other trusses were relocated to cover a pedestrian entry into the mall (Figure 5).

The mall itself retains the exposed simplicity of an unadorned industrial aesthetic. The plaster mall buildings, while defining spaces and layers of space, also act as a backdrop for the many industrial components of steel. In addition to the trusses, exposed steel is the dominant material in a 140-foot high tower sign, the pedestrian entrances, a small kiosk building and the awning supports. Stylized steel *lammasus,* the winged lions with human heads from Assyrian mythology, articulate not only the entrances to the mall, but to the project itself. Ever-present steel Assyrian archers appear to guard the mall from above (Figure 6).

The industrial aesthetic was extended beyond the outlet mall. When the frontage wall required seismic bracing, it was achieved with a steel frame exposed to the interior of the project. White doughnuts-shaped planters, reminiscent of inflated inner tubes from the original factory, ring each palm tree in the grand allée. A new exit stair from the administration building was done entirely in exposed steel.

Rehabilitation

Rehabilitation activities centered around the three major components from the original tire plant: administration building, frontage wall and factory trusses. Each presented its own challenges and design problems.

Of the three, the administration building was the most difficult and costly. Structurally, the building was originally designed with non-bearing perimeter concrete walls. They surrounded a riveted-steel framing system that supported two-inch thick, nominally reinforced concrete floors and a wood roof. There was only nominal seismic resistance.

In its fifty years of life, the building had experienced substantial deterioration. Years of exposure to fumes from sulfur compounds had reduced the strength of the perimeter concrete walls to as little as 800 psi. Five major earthquakes had loosened many joints and connections. A fire during the early design phase severely weakened the unprotected steel framing of the upper three floors, making all of them vulnerable to further earthquakes.

The structural rehabilitation included several major elements. A finite element analysis, by the engineering firm of Meyers, Nelson, Houghton, identified specific weakness in the building (Figure 7). The resulting corrections were all designed to be concealed inside the building, a

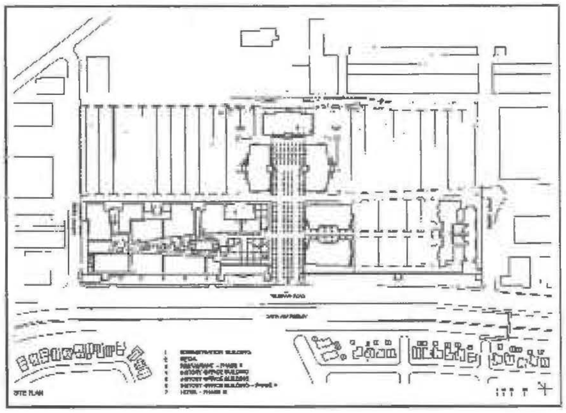

Figure 3. The Citadel site plan. (Photo courtesy of The Nadel Partnership)

Figure 4. Grand allée and office buildings. (Photo courtesy of The Nadel Partnership)

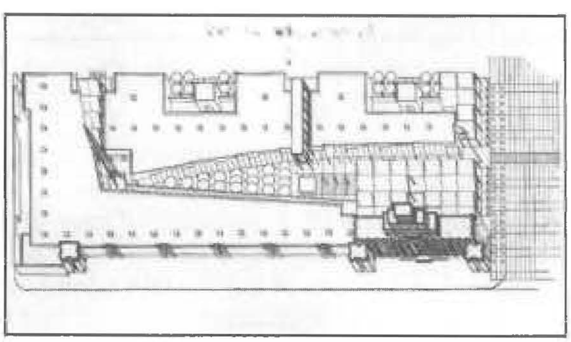

Figure 5. The retail mall. (Photo courtesy of Sussman/Prejza & Company)

Figure 6. The retail mall. (Photo courtesy of Sussman/Prejza & Company)

difficult task with story heights as low as ten feet. They included the following:

1. Six-inch shotcrete walls on three sides, below the original roof, to stabilize the weakened concrete.
2. New interior steel frame with metal deck and concrete floors.
3. New interior shear walls and footings.
4. Strengthening of horizontal diaphragms.

Air conditioning was non-existent in the original building, as was any space to install mechanical equipment. Window units had been added to some offices, but these had long since lost their effectiveness and detracted from the appearance and image of the building.

Fortunately, some of the building's parapets were high enough to conceal small pieces of equipment. Instead of a single system, several small systems were designed incorporating small equipment that could be concealed below parapets. Even with the necessary vibration isolators, the equipment is invisible from the freeway. The pilasters on the front of the building, difficult floor space to use efficiently, were converted to vertical duct shafts and return-air plenums. Horizontally, ducts were threaded through bar joists. Holes were cut in girders, and reinforced where necessary, for duct passage.

The lobby, incorporating many Assyrian Revival elements, needed complete replication. Originally, the walls were built of hollow clay tile and covered with combed plaster scribed to resemble stone. A coffered ceiling was suspended by a combustible, fibrous material. The floor, of painted concrete, was cracked beyond repair.

The original hollow clay tile walls, with little if any seismic capability, were replaced with eight-inch concrete shear walls as part of the structural retrofit. These were then covered with combed plaster to match the original. A new suspended ceiling was installed, again matching the original. A green slate floor was installed, color coordinated to the colors of the frontage wall. Fiberglass molds were taken of all the plaster ornamentation, including the winged maidens, human-headed light sconces, and the frieze of chariot warriors. All were replicated and replaced. New doors were fabricated for both the building and elevator entrances. All metal work, such as the papyrus-patterned mezzanine handrail, was removed, refurbished and reinstalled. A new rail was installed on top of the original handrail to meet code-mandated height requirements. A new elevator was installed with its equipment in a heavily-insulated nearby room.

The most difficult code challenge was exiting. The stepped-back upper floors had no second exit. Without utilizing excessive floor space, there was no realistic way to incorporate a second stair into the ziggurat configuration. An exterior stair, cantilevered off the back of the building, was added to lead to the roof of the third floor. From there, a new freestanding exterior stair at the east end of the building conducts people to the ground. This new stair incorporates the industrial vocabulary described earlier and was painted purple to emphasize that fact.

The original frontage wall presented different challenges, chiefly in the areas of structure and finish. Originally, the wall had been supported vertically by imbedded steel columns and laterally by the original factory. Much of the factory had been demolished by a previous owner. Due to earthquakes, the steel columns had become detached from the wall. The wall was very vulnerable.

For the freestanding portions of the wall, a new steel frame was installed on the interior or project side of the wall. It consisted of pairs of columns, twenty feet apart, cantilevered out of the ground. Two rows of horizontal beams connected each pair of columns. The west end

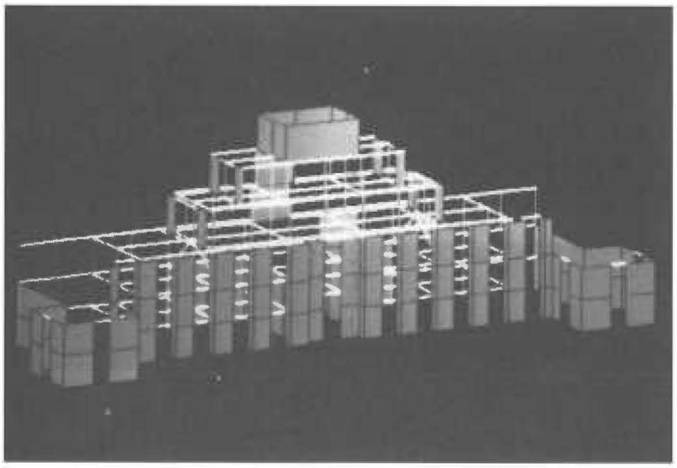

Figure 7. Finite element analysis of the administration building. (Courtesy of Meyers, Nelson, Houghton)

of the wall was supported laterally by the new outlet mall building.

The finish of the original wall had seriously deteriorated. The concrete wall, through the use of form liners, had been cast to simulate individual stones. According to Martin Weil, each "stone" had been individually stained with a mixture of hydrotite paste and lime-proof color. Several coats of color glazes gave the wall an antiqued appearance, a patchwork of muted camouflage colors.[3] Over time, cracks had developed in the concrete, holes had been cut in the wall and the colors had generally faded. External shoring, required for the structural repair, had resulted in many new holes. Because new concrete was required to repair the wall, a uniform restoration of the finish was not possible.

The decision was made to paint the wall and the administration building. Deborah Sussman, of Sussman/Prejza & Company, designed several color schemes to highlight the design aspects of the wall. These were tested on various sections of the wall, drawing numerous unsolicited, mostly negative, phone calls from passing motorists. The final color scheme of greens and beiges was utilized throughout the Assyrian elements of the project.[4]

Work on the factory trusses was primarily structural. Indicated to be freestanding in the final design, they had little inherent seismic capability. Strengthening was required from the foundations to the roof. Included were a roof diaphragm of structural plywood and another diaphragm of exposed steel x-bracing at the bottom chord of the trusses. Interior columns required cover plating, while perimeter columns were converted to knee-braced rigid frames for lateral resistance. The restored trusses were then painted, in keeping with the factory/industrial architectural vocabulary.

One by one, the challenges were faced and resolved. Surprises were overcome, setbacks surmounted and compromises made, all with a vision of what the project could be. A fantasy was saved. The City of Commerce has saved their only real landmark. Subsequently, they incorporated it into their city logo. Trammell Crow has a viable mixed-use development. The residents of Los Angeles have been given a new life for their brooding, Assyrian Revival castle.

Notes

1 Martin Weil, *Uniroyal Tire & Rubber Factory Historical/Architectural Assessment*, unpublished, A-23.

2 Ibid., A-27.

3 Ibid., A-34.

4 Painting the wall has elimiated what Deborah Sussman called the original's "color of Smog."

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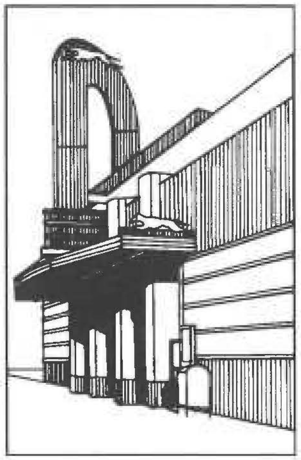

Rediscovery of the Recent Past

The Preservation Movement Rediscovers America

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Long-held views of American history are changing to include persons, places, and events previously overlooked. When the National Historic Sites Act was passed in the 1930s, Americans had little doubt about what constituted the heritage of a nation and its people. In the minds of most, it was the magnificent edifices and places associated with monumental events of war and peace and the great personages that had shaped the direction of the nation since its beginning. That the predominant European groups that settled particular sections of the country were to be honored for their contributions to our heritage was an accepted principle.

However, from the passage of time and the experience gained in the administration of the National Historic Preservation Act of 1966 by the National Park Service (NPS) and the state historic preservation officers at the state and local level, a new perspective has evolved on what constitutes the heritage of this nation. We have begun to recognize that large and diverse ethnic and racial groups, plus the indigenous Native American population, have left a rich and varied legacy of accomplishments and historic places that cannot be ignored.

The preservation movement has started to respond to this evolving historical perspective. African American heritage, along with the legacy of other ethnic and racial groups that make up America, is increasingly coming to the forefront of preservation activity nationwide. It was early in the 1970s that some in the national preservation movement first began to recognize gaps in the documentation of our legacy. History texts had generally overlooked the significant presence, before the nation's beginning, of African Americans and their contributions to the nation's development, other than references to the unseemly manner of their passage to America and their influence on the American Civil War. Dependable archival material that could document this history was unavailable from conventional record-keeping sources. The omissions and indifference reflected the pervasive de facto and de jure patterns of segregation of more than three centuries that divided America into two separate communities--one black and the other white.

Then, as a consequence of the pressures rising from the civil rights struggles of the 1950s and 1960s and the questions from a people thirsty for knowledge of their own racial heritage, Afro-American studies programs began to appear in many colleges and universities. These black studies programs fostered research and more inclusive interpretations of American history. Meanwhile, the history profession, which at one time considered local history to be less worthy of research attention than politics, war, and great men, developed a new and broader focus. Architectural history, too, began to give scholarly attention to everyday buildings, the vernacular architecture and cultural landscapes that provide the character of our communities. Most important, private black heritage societies and a growing number of African American museums began to explore new sources of information and use

new techniques, such as oral history, to make up for deficiencies in conventional recorded history. These groups began combing their neighborhoods, churches, fraternal organizations, and family records to develop archival and oral history records that could provide a basis for a more complete understanding of the nation's history. They developed exhibits and promoted black heritage trails to the places associated with African American history in their communities.

During the 1970s and early 1980s, there were sporadic efforts to use historic preservation strategies both to fill in the gaps in our view of history and to improve the quality of community life. Spurred by the Bicentennial, the NPS contracted with an African American consulting group to identify potential National Historic Landmarks associated with black history. Working with the Rhode Island State Historic Preservation Office, for example, the consultants recommended the site of the August 1778 Battle of Rhode Island in the town of Portsmouth, where the First Rhode Island regiment, all black except for its officers, fought valiantly as part of the American revolutionary forces. Other sites, such as the Martin Luther King, Jr., Historic District in Atlanta, were also designated as landmarks at this time. The NPS then added National Historic Sites associated with prominent black historical figures like George Washington Carver and Booker T. Washington, and later Frederick Douglass and Maggie Walker, to its system. The Kansas Historical Society in 1977 published a report, "Black Historic Sites: A Beginning Point." Neighborhood housing programs in Cincinnati and Pittsburgh, encouraged and assisted by the National Trust for Historic Preservation (NTHP), preserved historic neighborhoods. In Brooklyn, the Society for the Preservation of Weeksville and Bedford-Stuyvesant History set out to preserve the remains of a 19th-century African American community in the midst of an urban renewal project. The number of local African American museums increased and state historic preservation officers (SHPOs) nominated larger numbers of African American properties to the National Register.

By the late 1980s, the black community's surge of interest in the relationship of its patrimony to the preservation movement motivated both the National Trust, representing the private nonprofit sector, and the National Conference of State Historic Preservation Officers (NCSHPO), representing public programs in the states, as well as the NPS, to step up efforts to involve a more diverse constituency in historic preservation. Through various meetings and committees convened over the decade to address this issue, it had become clear that extraordinary efforts were needed if the full sweep of the nation's history was to be preserved. The National Trust, as the private, nonprofit organization chartered by Congress to encourage public participation in the preservation of historically significant sites and buildings, has been actively engaged in funding and encouraging African American preservation activities, especially in inner-city neighborhoods. In addition to several special meetings to address issues of cultural diversity, recent national conferences of the National Trust have brought attention to the issues, projects, and success stories of African American historic preservation efforts and have increased the diversity of conference participation through a scholarship program. Through these opportunities for learning and interaction, statewide and local organizations, such as the Indiana Landmarks Foundation, have been encouraged to set up special projects to involve African Americans. The Trust also published an Information Series Booklet[1] and a special edition of *Historic Preservation Forum* to go along with the 1992 conference theme of Cultural Diversity in Historic Preservation.

The National Park Service, as administrator of the federal government's historic preservation program, has undertaken several special initiatives, such as this book, that address needs of particular ethnic groups. The Historically Black Colleges and Universities project, underway for several years in the Department of the Interior, is an example. This initiative provides technical assistance in defining rehabilitation needs for significant campus buildings and funding for work on these buildings to selected colleges. Additional NPS-sponsored initiatives and activities targeted at Historically Black Colleges and Universities have included student internships, an architectural measured drawings course, historic preservation and planning curriculum development, and a variety of training opportunities in professional cultural resources management.

The National Conference of State Historic Preservation Officers has also addressed the issues of cultural diversity. As administrators of the national program in the states, SHPOs are responsible for identifying, evaluating, and preserving the broad patterns of the nation's history as it is found in the historic properties of their states. It is, therefore, critical that they and their staffs be able to under-

stand the fullest range of that history. In 1988, concerned about the issues and questions being raised in various preservation forums and confronted with increasing requests for cultural preservation and broader recognition, the NCSHPO established a Task Force on Minority Participation in State Programs, chaired by this article's authors, to undertake a two-year study of the issues. The task force recognized that several SHPOs had begun initiatives to increase minority representation in their programs but knew that these special actions were not widely publicized. Task force members realized that programs in the states needed assistance, possibly based on the development of networks of support. They were convinced that concentrated efforts were needed to bring groups outside the traditional preservation network together with the public and private programs that could assist their community revitalization efforts.

One of the initial ventures of the NCSHPO task force, supported by the National Trust through a Critical Issues Fund grant, was a plenary session during the 1989 annual meeting of the NCSHPO. There a panel of SHPOs, African Americans, and other ethnic representatives active in state and local preservation presented some of the issues they had encountered to a national audience of preservation professionals and interested citizens. The task force continued to sponsor workshops and special sessions at national meetings to educate professionals and address perceived barriers. Its final report to the NCSHPO included recommendations for minority professional development in the preservation field as well as the results of a survey of minority program activity in states that identified African Americans and Native Americans as the predominant cultural groups with whom the states were working.[2]

The special initiatives of the National Trust, NPS, and NCSHPO to assess the status of diversity in the historic preservation movement and to encourage broader participation from African Americans have brought to light a remarkable variety of current activity. Recent endeavors include cultural resource surveys, National Register nominations, contextual and planning studies, building rehabilitation projects, and community development projects. Museums seem to have been the first response to the impetus to make America's black heritage visible. Black heritage museums across the country display the full panorama of this history, from the 1619 landing of 20 Africans in Virginia as indentured servants to the civil rights movement in Montgomery, Birmingham, and elsewhere. More important, the built environment is offering an ever expanding view of the life of African Americans, with such buildings as the Prudence Crandall House, New England's first female black academy, in Canterbury, Connecticut; the Madame C. J. Walker Building in Indianapolis, Indiana, the site of a successful hair products company; and the Great Plains Black Museum in Omaha, Nebraska. Many, like William F. Drake Hall at Alabama A & M University, an archives and museum, or the Smith-Robertson Museum and Cultural Center in a former school building in Jackson, Mississippi, are located in restored historic buildings. Several are in historic churches, like the African meetinghouses in Boston and Nantucket and the South Dakota Black History Museum in an early African Methodist Episcopal church. Recent examples that seek to display history and culture and interpret historic buildings include the Beach Institute African American Cultural Center in a 1869 missionary school building in Savannah, Georgia, and the Delta Cultural Center in the restored 1915 Missouri Pacific depot in Helena, Arkansas, where the culture of the Delta region, including blues music, agriculture, the Civil War experience, and the African American experience, is exhibited.

In many states, the interpretation of existing historic sites is being revised and amplified to include all of the ethnic and cultural groups associated with the site's history. Williamsburg, for example, now includes black history and slave culture in its interpretive program, as do many plantation sites in southern states. Somerset Place, a state historic site in North Carolina has attracted national attention for its homecoming celebrations, which bring together descendants of the slaves who lived and worked there. In addition, a growing number of tour guides serve the increasing interest in African American places. Alabama, Georgia, and Ohio, in joint ventures between state offices of historic preservation and tourism, have produced tour brochures. The National Trust has included black history promotions in its Heritage Tourism initiative. The Pepperbird Foundation in Hampton, Virginia, a nonprofit organization for multicultural heritage, produces heritage brochures for several southern states. Michigan published "Pathways to Michigan's Black History" to point the way to African American historic places in that state. Florida's state historic preservation office recently published a statewide guide to black heritage sites that presents historical narratives containing little-

known information about the long history of African Americans in that state. In many states one can find a growing number of local black history tours and trails, such as Rhode Island's Freedom Trail and the Negro history trails in Boston and Savannah. The number of special conferences, such as Pennsylvania's annual black history conference, is growing. Local and statewide heritage education programs increasingly include African American history components.

The expansion of interest in places where African Americans lived and worked would not be possible without the data and research produced by the preservation movement. As this book illustrates, most of the states have recognized significant African American buildings and neighborhoods through National Register listings and Determinations of Eligibility. The federal project review process occurs when a federally financed or licensed project threatens older areas where African Americans lived, such as rural farms and plantations or urban neighborhoods. Because SHPOs must consider a variety of resources as they assess the effects on the built environment through this review process, they have begun to see a broader picture of that environment. As questions are raised about traditional survey and research methodologies, SHPOs are encouraging and supporting surveys and new types of historical context studies designed to find and evaluate African American resources. In fact, there seems to be an explosion of special black heritage surveys. They are both statewide, as in California, Indiana, Ohio, New York, and Washington, and regional and local, as in Allegheny County, Pennsylvania; Okmulgee County, Oklahoma; North Omaha, Nebraska; Minneapolis, St.Paul, and Duluth, Minnesota; Little Rock, Arkansas; Thomasville, Georgia; and Newport, Rhode Island. Recent special studies include "Invisible Hands," a study and traveling exhibit produced by a local preservation organization in Macon, Georgia, that identifies the work of more than 6,000 African American craftsmen, designers, and builders who contributed to the building of the city. The *Florida Black Heritage Trail* is not just a traveler's guidebook but a compilation and analysis of new historical information. The project's impetus was the discovery of an archeological site near St. Augustine, Fort Mose, established in 1738 as the first legally sanctioned free black community in what was to become the United States. Posters featuring Alabama's historically black college campuses and a calendar of the historic black churches of the state were possible because of surveys and National Register nominations encouraged by the Alabama Black Heritage Council. *African-American Historic Places: Buildings, People and Culture,* a resource guide from a Georgia project of statewide workshops, focused attention on the cultural associations of historic properties and the people they represent. Archeological investigation, initiated in response to a federal construction project at Foley Square in New York City, has brought to light the earliest history of the city in a large, long-forgotten African American burial ground.

Making communities aware of this history through surveys and National Register nominations, tour guides, heritage education exhibits, and museums makes it more likely that the contributions of all citizens will be considered in planning and development. Buildings that represent black history are being rehabilitated and adaptively reused in many communities. For example, the Murphy-Collins House in Tuscaloosa, Alabama, the home of one of the first licensed black embalmers in Alabama, now serves as the office of the Tuscaloosa County Preservation Society and a museum of African American heritage. A home in Birmingham, Alabama, built to house orphaned and elderly African Americans now serves as a nursery for underprivileged children. A 1935 gymnasium in a black school district in Nevada County, Arkansas, now serves as a community and social center. A restored 1850s cottage in Natchez, Mississippi, contains a gallery and shop featuring African American arts and crafts. Historic residential buildings are providing affordable housing. Shotgun houses in Macon and Augusta, Georgia, and Shreveport and New Orleans, Louisiana, have been rehabilitated using tax incentives and creative financing by local governments and nonprofit housing and preservation organizations assisted by their state historic preservation offices. The contributions that historic preservation can make to neighborhoods was recognized early in places like Cincinnati and Pittsburgh. Now, activity can be seen from New Orleans's Lower Garden District to Chicago's Black Metropolis and from Baltimore and Washington, D.C., Jacksonville and Tampa, Florida, to St. Louis, Missouri. The connection between community development programs, many funded through the Department of Housing and Urban Development (HUD), and historic preservation is one of our greatest unfulfilled opportunities to make the history of African Americans and other ethnic groups relevant to contemporary life. The National Trust and the NCSHPO, working with HUD and the President's Advisory Council on Historic Preservation, in 1993 initiated new efforts to encourage the

use of historic resources in housing and community development programs.

Even such a cursory sampling of preservation activity demonstrates a growing awareness throughout the country of the buildings and sites of African American history that had for so long gone unnoticed and a rising concern on the part of African Americans that these places not be lost. As the chairman of Georgia's Minority Historic Preservation Committee wrote, "Preservation is personal. A story, an event or a family connection becomes a reason to get involved in the restoration of a building, a neighborhood, or a town."[3] African Americans are increasingly and personally concerned about historic places and are making efforts to preserve them. Unfortunately, many African Americans have been working in isolation, either unaware of the larger preservation movement or believing it was irrelevant to them. The growing attention to African American historic resources by both professional programs and citizen organizations suggests this is changing.

Our understanding of our history and of what is worth preserving has grown. Through the surveys and studies, the exhibits and tours, and the growing interest in the preservation of all of our history, we have begun to see the imprint of many peoples on our cultural landscape and to develop a broader view of the development of our communities, both urban and rural. At the 1991 conference of the National Trust, author David McCullough aptly described this phenomenon as the lights on a stage coming up to reveal all of the people who had been there all of the time.[4]

These changes have not happened without extraordinary measures on the part of both preservationists and other interested citizens. It has been necessary to locate and explore new sources of information and documentation, to expand our methodologies and research questions. In this process the contributions of African American museums and black heritage societies have been notable. Further progress will not be possible without continued expansion of our horizons and without special measures that bridge the gaps between traditional preservation organizations and other organizations and community groups. Black heritage councils, like the one established in Alabama in 1984, and special committees, like Georgia's Minority Historic Preservation Committee, set up in 1989, are springing up in many states, especially in the Southeast, where Kentucky, Mississippi, and South Carolina have recently established special committees. In other states such as Maryland, Michigan, Oklahoma, and Pennsylvania existing black history advisory committees are expanding their attention from documents and artifacts to historic places. The attention of the more recent African American preservation committees to the built environment, the physical imprint of history on the land and in the community, is an important new development. These committees thus bridge earlier concerns that history be made visible through research and exhibits of the material culture of African Americans and preservation concerns that are increasingly coming to the forefront. They can serve as the community forums that bring collective interest and concern to the attention of agencies and organizations that provide technical assistance and support, like the SHPOs, statewide and local preservation organizations, and their national counterparts, the NCSHPO, the National Trust, and the NPS.

How we understand our history is important to the preservation of that history. When we set aside a portion of our history as distinct, through such mechanisms as Black History Month, and fail to connect it to our other national celebrations, such as the Fourth of July, our understanding is incomplete. That we have made a substantial beginning in "rediscovering America," as one of the authors directed us several years ago,[5] is evident in the African American activities and information chronicled here. Much remains to be done. The context of our history is infinitely richer and more complex than we had previously realized, and the historic places that embody that rich history deserve to be preserved. Indeed, the role of preservation is expanding into wider areas of contemporary life. As the mosaic of the nation's people becomes more diverse, we are on the threshold of even greater opportunities to connect historic preservation to broader social, economic, and cultural objectives that truly represent our full national heritage.

Notes

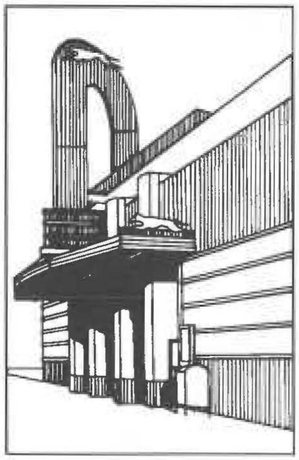
[1] Elizabeth A. Lyon, *Cultural and Ethnic Diversity in Historic Preservation,* Information Series, no. 65 (Washington, DC: National Trust for Historic Preservation, 1992).

[2] National Conference of State Historic Preservation Officers, "Minority Participation in State Historic Preservation Programs Task Force Report" (Washington, DC: National Conference of State Historic Preservation Officers, 1991).

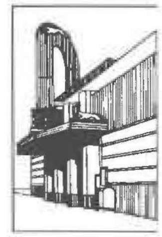
[3] See Janice White Sikes, *African American Historic Places and Culture: A Preservation Resource Guide for Georgia.* (Atlanta, Georgia: Minority Historic Preservation Committee and the Office of Historic Preservation, Georgia Department of Natural Resources, 1993).

[4] See David McCullough, "A Sense of Time and Place," *Past Meets Future: Saving America's Historic Environments* (Washington, DC: The Preservation Press), 29-35.

[5] See "Task Force Report."



Getting Around in the Twentieth Century



Dog Days - Saving a Greyhound

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Many large cities, over the last twenty-five years, have experienced significant changes in their economic, demographic, and cultural bases as the makeup of their corporate and population mix shifted. Cleveland, Ohio, has been no exception to this trend. At the beginning of the twentieth century, Cleveland was one of the nation's leading industrial centers. The face of the city reflected this in almost all of its physical attributes. Situated where the Cuyahoga River empties into Lake Erie, Cleveland enjoyed vigorous industrial growth. The convenience of waterborne transportation facilitated conveyance of massive quantities of raw materials to the city's huge steel mills and refineries, and the subsequent distribution of the finished products to the markets of the country.

Cleveland's downtown and its industrial complexes grew up next to each other. The industrialists that oversaw and directed the development and operation of Cleveland's industries also lived nearby on Euclid Avenue, where they built over two hundred magnificent mansions. The street became know as Millionaires' Row, because of its wealthy residents, not the least of whom was John D. Rockefeller.

Being an industrial city served Cleveland well between 1850 and 1950. At its zenith, Cleveland's population had grown to just short of one million inhabitants, many of whom had good paying jobs in factories, steel mills, and refineries. The grit and smells of throbbing factories were a sign of success and, although they were often quite evident in downtown Cleveland — and along Millionaires' Row — they were tolerated with little complaint.

Heavy industry began to decline in Cleveland after World War II. People became more and more conscious of the impact these industries had on the city, not just in the number of jobs that were being lost, but also in the effect that the dirt and odors were having on the downtown area itself. As factory jobs were being replaced by office jobs, the sensibilities of the city inhabitants were sharpened. The smell of success was no longer sweet, and the success itself had now become somewhat tarnished. Not surprisingly, the Cuyahoga River had also suffered from over one hundred years of abuse. Industry had used the Cuyahoga River in a multitude of ways, not the least of which was as a disposal system for waste. The real turning point in the way people viewed their city came in 1969. In that year, an oil slick on the overtaxed Cuyahoga River caught fire. The aftermath of this event, together with a multitude of other concerns, moved the city toward making a serious effort to rehabilitate its downtown and industrial areas.

Cleveland's rehabilitation began in the early 1970s with a view toward the twenty-first century. New buildings began to rise downtown. The river banks and the lake front that the city had for so long turned its back on began to be cleaned up and revitalized. With the cooperation of industry, pollution of the air and water began to succumb to efforts at control.

These renovations did not come without some expense to the historic fabric of the city, however. An effort to protect the city's architectural heritage from irreversible damage was initiated by concerned citizens. As a result, Cleveland's

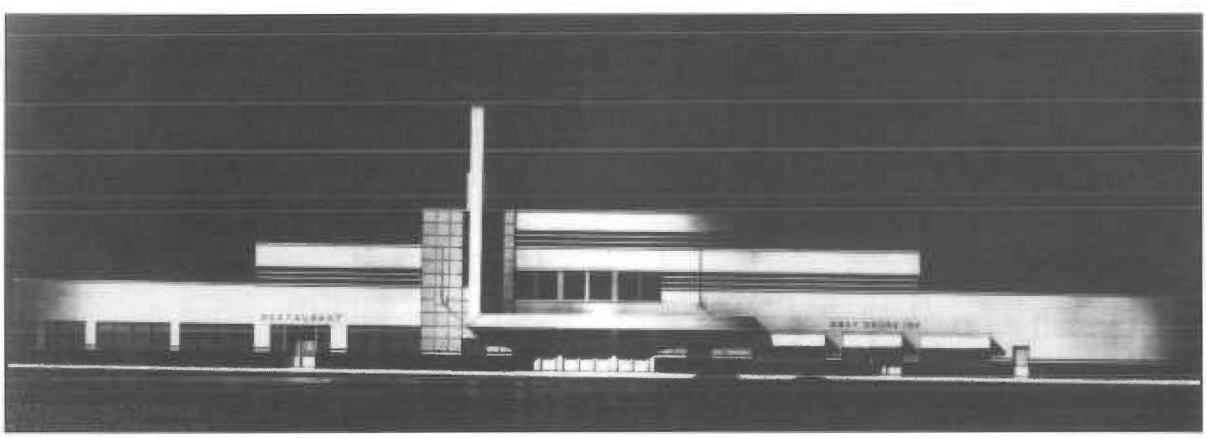
first preservation organization, the Cleveland Restoration Society, was formed. The Society grew to play an important role in educating the public about Cleveland's historic structures and in helping to ensure the future of the city's historic fabric.

By 1990 Cleveland had made gigantic strides in improving its city center. On the eastern perimeter of this revitalized center was downtown Cleveland's only Streamline Moderne structure, a Greyhound bus terminal. Designed by William Strudwick Arrasmith and opened in 1948, the terminal had served the city without interruption for over forty years. Although the building had been overlooked during the heat of the downtown revitalization of the 1970s and 1980s, attention was now being turned to the Greyhound terminal and what its future role in the overall city plan should be.

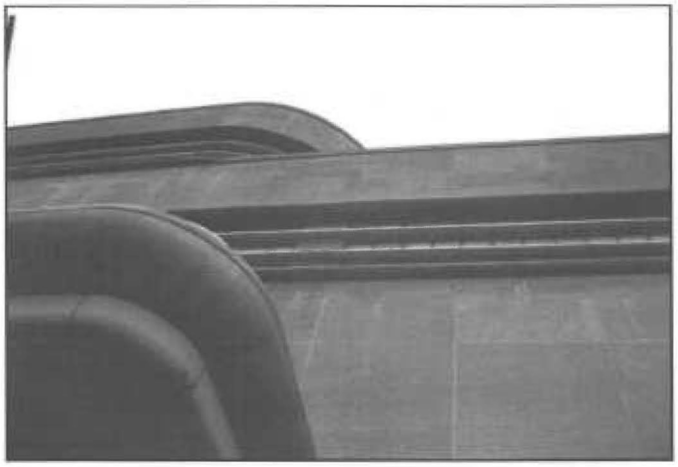
Cleveland's magnificent Playhouse Square district, the third largest complex for the performing arts in the country, was only one block away. Built during the golden age of theater construction and design in the early twentieth century, it consists of three completely restored theaters that draw an up-scale clientele. Some thought that the presence of the Greyhound terminal detracted from the glitter of the Playhouse district and that the bus station attracted an undesirable element not in harmony with the ambience of Playhouse Square. The Greyhound bus terminal that had been built at a cost of over one million dollars and opened to great acclaim in 1948 had now lost its luster. In the opinion of some, what had been a beauty mark on the face of Cleveland had become a blemish.

The physical condition of the building itself was very good. Maintenance of the exterior and interior had been attentive, and the structure had survived its forty-plus years historically intact. Greyhound Lines, Inc., continued doing very good business, with buses coming and going at all hours of the day and night. The area surrounding the Greyhound terminal was not derelict, as was often the case in other cities. In fact, improvements had been going on all around the building. Immediately adjacent to the terminal was a city-owned parking lot that had taken the place of the least desirable of the nearby buildings. However, it was this very city-owned land that was now posing a threat to the future of the Greyhound terminal.

Several factors converged to threaten the future of the Greyhound terminal. Although the building bore the name Greyhound, Greyhound Lines, Inc., was merely a tenant. Dial Corporation, Greyhound's parent company, had sold off the bus transportation business but retained title to several of the terminals in major downtown locations, including the one in Cleveland. The building's owner had listed the property for sale and was seeking bids at an asking price of three million dollars. Greyhound Lines, Inc. had been given notice in 1990 that it was to vacate the premises by year's end. At this point, Greyhound was unable to purchase the building at the asking price. Furthermore, Dial Corporation had several parties interested in the property. The most likely purchaser was Playhouse Square Foundation, which also wanted to acquire the city-owned property adjacent to the terminal. The Foundation proposed building a thirty million dollar complex of apartments, markets,



Original rendering for Cleveland Greyhound Bus Terminal by William Strudwick Arrasmith. (Photo credit: Frank E. Wrenick)



The Streamline Moderne lines of Cleveland's Greyhound Terminal emphasize the speed and efficency of bus transportation.
(Photo credit: Frank E. Wrenick)

and restaurants on the combined land. The fate of the Greyhound terminal in the hands of the Foundation was speculative at best. Plans varied from utilizing the building in a manner suited to the complex, to razing it to make way for totally new construction.

Meanwhile, Cleveland City Council took steps to facilitate sale of the Greyhound terminal and the Foundation's plans to purchase both pieces of land. The Councilman for the district encompassing the terminal introduced an emergency resolution opposing its designation as a city landmark. Without the Councilman's endorsement of landmark status, it would not be possible to obtain the designation. A public hearing for action on the landmark designation was imminent when these perilous circumstances first became known to those interested in assuring preservation of the Greyhound terminal.

Emergency steps to save the Greyhound terminal were initiated. Quick action was required before the door closed on any chance of achieving landmark status. Without landmark designation there would be nothing standing in the way of the property owner demolishing the building free of protective hearings and restraints. Several approaches were implemented. The Cleveland Restoration Society was consulted and agreed to take part in a campaign to protect the building. The Society joined in entering an appearance at hearings involving landmark designation. They likewise joined in directing communications to the district Councilman urging that his position opposing landmark designation be reversed and that he instead sponsor landmark status.

At the hearing, testimony in support of the landmark designation was entered and all Landmark Commission members were furnished with a booklet containing historical information about the Greyhound terminal and its significance both locally and nationally, together with renderings of the adaptive use being made of a similar Greyhound terminal in Washington, DC. The Commission expressed sincere interest in the testimony, which gave hope that action had not been too late.

Subsequent to the hearing, letters urging the district Councilman to sponsor landmark designation were delivered, and a meeting was held with the Councilman to discuss the matter. Shortly thereafter, word was received that the Councilman had reversed himself and now agreed to sponsor landmark status for the terminal. Unfortunately, pressure was brought to bear on the Councilman to reinstate his initial position against landmark designation. As a result, the Councilman again reversed himself and opposed landmark designation. Further communications on the matter were unproductive. In the hope that something could be salvaged, a letter was directed to the Mayor reviewing the circumstances and explaining the importance of the Greyhound terminal. The Mayor's response was polite, but not what was hoped for. As things stood, the terminal was on the block, landmark designation was not a reality, and the future was highly uncertain.

Cleveland Greyhound Bus Terminal as it appeared in early 1991. Note the "For Sale" sign and scrap wood left by striking bus drivers. (Photo credit: Frank E. Wrenick)

Several months passed without further activity. Nevertheless, a watchful eye was maintained to be sure that when anything arose that would have an impact on the Greyhound terminal it would not come as a surprise. In the interim, strategy was developed to implement active promotion of the preservation campaign.

Similar efforts to preserve Cleveland's last remaining golden-arched McDonald's drive-in had been enhanced by the successful nomination of the building to the National Register of Historic Places. Eligibility for listing in the National Register provided strong support for efforts to preserve the drive-in. It was determined that a nomination of the Greyhound terminal should be made in the hopes of achieving a similar result. This effort would help support the momentum of the initial efforts and maintain the interest of those involved with the situation. It would also present an opportunity to involve other preservation interests in the project. Accordingly, Cleveland's Western Reserve Historical Society was approached for input on a nomination to the National Register. Since the Society had assisted with the McDonald's nomination and ultimately had accessed the dismantled building, contents, and signage into its permanent collection, it was receptive to assisting with the nomination of the Greyhound building to the National Register. Additional assistance was obtained from a member of the Ohio Historic Site Preservation Advisory Board - the agency that would pass on the nomination.

While National Register designation was pursued, plans were made with the Cleveland Restoration Society to present a public forum on the Greyhound terminal. The Society had conducted numerous forums on other historic sites in Cleveland, but this would be the first to be presented on a building that was not under immediate threat of demolition. The objective would be to educate the public about the Greyhound terminal, its significance to downtown Cleveland, and the important part it could play in the overall rehabilitation the area.

In addition, steps were taken to bring media attention to the status of the Greyhound terminal. Cleveland preservationists of note were encouraged to write articles for publication that would help focus public attention on the building and its circumstances. Articles appeared in Cleveland papers, and a radio talk show interview on the subject further alerted the public to the potential loss of one of Cleveland's best-known landmarks. Also, efforts were made to reinitiate consideration of the suspended landmark designation.

At the same time, an article appeared in a Cleveland business newspaper publicly announcing the formal proposals of the Playhouse Square Foundation for its development of the

Greyhound terminal and surrounding properties. The article also pointed out that Greyhound Lines, Inc., had already determined that it would not be able to acquire the terminal because of financial considerations. Uncertainty about the terminal's ownership and future was now of even greater concern.

As research and drafting progressed on the National Register nomination, work commenced on the forum. It was determined that a tour preceding the forum would be highly effective in bringing all attendees' attention to the quality of the building, its excellent condition, and the beauty of its unique style. A visit to the site would also demonstrate, far better than words alone, how this building was still able to effectively serve its occupants and the traveling public in the 1990s, just as it had done ever since its grand opening in 1948. A tour would provide a first-hand encounter between the public and this architectural masterpiece. It would give the participants an opportunity to inspect the building and ask questions that could be answered by knowledgeable historians and preservationists conducting the tour. When the tour attendees adjourned to the forum they would carry with them a vivid and fresh impression of the building itself that would enhance their appreciation of how it could best be utilized and why it should be preserved.

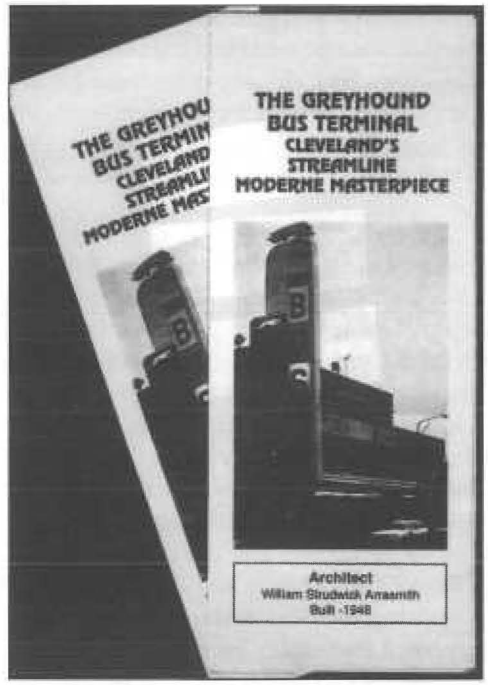
Clearly, forum participants needed to be provided with complete information regarding every aspect of the preservation effort. The program first discussed the history of the building's architectural style and how it fit in with other Greyhound terminals of the era. The connection between its architect and Cleveland was demonstrated. A survey of surviving Greyhound terminals illustrated the exceptional qualities of Cleveland's terminal in light of everything presented. Slides were presented depicting postcard renderings of original Greyhound terminals and contemporary photographs of existing terminals in other cities showing various states of repair and styles of adaptive use.

A panel discussion, concluding with questions, followed the introductory presentation. A broad spectrum of professional specialists each spoke to a particular facet of the challenge presented by the Greyhound situation and efforts to assure its preservation. Panelists included an architect, a city planner, an architectural historian, an Historic Site Preservation Advisory Board member, the lead designer for adaptive reuse of a Greyhound terminal, vice-president of Playhouse Square Foundation, an architectural journalist, an attorney, and a preservationist. Although the owners of the terminal were represented at the forum by local counsel, their representative made no remarks and was present only as an observer.

Topics covered included the significance of the Greyhound terminal as an historic building, the City Planning Department's overall scheme for the general area in which the terminal was located, the proposal for development of the terminal and adjacent property, the possible adaptive uses for the terminal and surrounding property, the adaptive reuse and development of the Greyhound terminal in Washington, DC, and the National Register of Historic Places and its purpose and function.

Six- and twelve-story apartment buildings and a two-story retail facility would be added to converted Greyhound terminal (right). (Photo credit: Crain's Cleveland Business, Vol. 11, No. 26 June 25 - July 1, 1990)

A local foundation gave the project a modest grant-in-aid, making it possible to conduct the forum free of charge to all attendees. All panelists and speakers donated their time and skills. Refreshments were also donated. A pamphlet announcing the forum was designed and printed at a nominal cost, and permission for touring the Greyhound terminal was obtained. Public service announcements of the forum were made by the media, and special mention of the forum was printed in a popular events column in the Cleveland newspaper.



Brochure published to advertise the Greyhound Bus Terminal Forum. (Photo credit: Frank E. Wrenick)

The National Register nomination of the terminal continued to progress. Although a property may be eligible for listing, it will only be listed if the owner agrees. The owners of the Greyhound property were not interested in its being listed and were against the nomination. It was their opinion that the building was not totally original and that alterations over its long life had diminished its eligibility for listing. The owners also felt that a listing would hamper their ability to fully utilize the building or to find a buyer. Shortly before the forum, the Ohio Site Historic Preservation Advisory Board held a hearing on the nomination and unanimously approved it. Attendees at the forum learned of the Board's favorable ruling. Because of the owner's objections, however, the Greyhound terminal could not, in fact, be listed in the Register.

The forum was highly successful and achieved all of its objectives. Attendance was in excess of the capacity of the space available. The question-and-answer period at the end of the panel discussion was lively and productive. Public awareness of the circumstances that confronted the Greyhound terminal was raised, and it was gratifying to see that all in attendance were in favor of assuring that it would be preserved. Press coverage of the forum was good; articles appeared in the following Sunday's newspaper and in the publication of the Cleveland Restoration Society.

Subsequent to the Greyhound forum, activity once again subsided but a vigilant watch was maintained by all concerned parties in order to assure that nothing detrimental would occur that might jeopardize the terminal's future prospects.

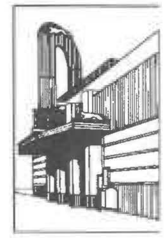
During the entire time that all of the above events were unfolding, Greyhound Lines, Inc., was in Chapter 11 reorganization proceedings. Shortly after the forum took place, Greyhound emerged from the reorganization and began to negotiate for the purchase of the terminal. Successful negotiations would put an end to the Playhouse Square Foundation proposals. Although Greyhound had considered other locations for its Cleveland operation, it determined that acquisition of the existing location would be the most cost-effective alternative. Negotiations for purchase of the terminal by Greyhound Lines, Inc., were successfully concluded, and thus the building's future was secured. It would continue to be utilized by the company for which it had been constructed over forty years ago. The outcome was greeted with a great deal of satisfaction in the preservation community, as the best possible result had been realized.

These events, from the initial efforts to obtain landmark designation to ultimate acquisition of the terminal by Greyhound Lines, Inc., had spanned two years. In the way of a postscript, subsequent developments have raised some concerns as to the security of the situation at this point in time. Greyhound Lines, Inc., has experienced some significant business reversals, with ridership on a decline. It also appears that maintenance of the terminal is now less attentive, and it may be that the future of the prop-

erty will once again be uncertain. With these developments in mind, the preservation community continues to maintain a close watch on the Greyhound terminal and to keep its circumstances before the public eye. Most recently, the Art Deco Society of Cleveland has been conducting downtown tours of significant buildings of the era and the Greyhound terminal is a major point on these tours.

Several lessons came out of this preservation effort. First and most important is the need to be ever-vigilant. An historic site may be under threat, but that fact may not be a matter of common knowledge. Only by maintaining a high level of awareness can preservationists be assured that nothing significant will escape notice. Second, once it is known that an historic site is threatened, immediate action is required to ascertain the status of the threat and its sources. Third, if the threat is urgent, the fact that there is an interest in preserving the site should be immediately made known to those in a position to directly affect survival of the site. Fourth, successful preservation efforts are an exercise in educating the public and those who will have a direct impact on the future of the site. Nothing should be presumed regarding their level of understanding, knowledge, or interest in saving the site. The only safe presumption is that the public and those in a position to affect the ultimate result must be fully educated on every aspect that demonstrates the site's importance and the need for it to be preserved. Fifth, demonstrate a sincere interest in working with all concerned to reach a result that will achieve the goals and objectives of those involved. It may not ultimately be possible to reach this result, but the effort should begin within the context of this philosophy. And finally, always believe that anything is possible.

In the case of the Cleveland Greyhound terminal, no one will ever know how great or small a part was played by the efforts undertaken to save it. The end result, however achieved, was certainly the most desirable one. The Greyhound terminal received a level of public exposure and education that would not have been possible without the existence of the threat.



Historic Development of the Metropolitan Washington Airports: A Framework for Preservation

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Introduction
The Metropolitan Washington Airports Authority and its consultants have been working in close cooperation with the staff of the Virginia Department of Historic Resources (the State Historic Preservation Office) and the Advisory Council on Historic Preservation on a variety of historic preservation projects related to the current Capital Development Program to improve Washington National Airport and expand Washington Dulles International Airport. This paper provides historic background on development of Washington's airports, and was written as a companion piece to the paper by Mary Harding Sadler of the Virginia Department of Historic Resources. The fact that the airports' preservation program is being presented in two separate but complementary papers is a reflection of the nature of this preservation partnership. Each partner in this team (including consultants: Robinson & Associates - National Terminal, Vitetta Group/Studio Four - Dulles Terminal, Greenhorne & O'Mara/ Engineering Science - Survey and Recordation) provides a unique perspective and plays an important part in the continuing success of the partnership.

Airport Preservation Projects
To many, a position of Historic Preservation Coordinator at a modern American airport would seem unusual, if not a contradiction in terms. At first, an airport would seem to be the last place one would expect historic preservation to be a consideration. It is not hard to get someone to accept that the phenomenon of commercial air travel has had a profound effect on the past, present and future development of our culture. And it is not difficult to make the point that the most tangible manifestations of this phenomenon, historic aircraft, are significant artifacts deserving of preservation (witnessed by the fact that the Smithsonian's Air and Space Museum continues to be the country's most visited history museum). However, the task becomes harder when you consider the less flamboyant aspects of aviation history: the nation's airports.

Airports are seen in a very different light than historic aircraft, for the basic reason that they are still fulfilling their original function. As much as one might appreciate the historical significance of an antique aircraft, few would be willing to fly in it. The airplane is historic because it is no longer in use, while a airport is historic precisely because it is. As a result, airport preservation projects represent a unique set of challenges, as the airport operator and the preservation professionals attempt to: 1) identify and preserve significant elements of the airport's past, 2) allow the active airport to meet present needs, and 3) provide for future growth.

In addition to their role as the gateways to the remarkable phenomenon of air travel, airports possess other aspects of cultural and historic significance. Airports serve as the proving grounds for the continuing evolution of aviation, electronic communication, navigation and safety technology; and therefore, each has played some role in the history of engineering. On a more local level, an airport has a significant effect on the socio-economic evolution of a specific city and the surrounding region. And finally, whether or not one fully appreciates the historic significance of a particular airport, it is a fact of law that some level of historic preservation

programming is a legally mandated requirement for most projects involving a federal agency. Given the pervasive oversight of the Federal Aviation Administration, most airport redevelopment projects will come under review.

Metropolitan Washington Airports

With the transfer of National and Dulles Airports from the Federal Aviation Administration, the Airports Authority entered into a 1987 Programmatic Memorandum of Agreement accepting responsibility for the airports' historic preservation planning. The Authority has identified 27 airport resources significant enough to be eligible for the National Register of Historic Places. These resources include a remarkable diversity of sites: from the archaeological remains of eighteenth-century Abingdon Plantation at National, to the modern architectural masterpiece of Eero Saarinen's Main Terminal at Dulles.

However, one should not assume that National and Dulles are unique, singular examples of airports designated as historic. A recent database survey from the National Register of Historic Places yielded information on seventy-eight airport/aviation-related properties (listed or found to be eligible). Clearly a number of airports and aeronautic-aerospace facilities have already been called upon to address the historic significance of their properties. Given increasing regulatory emphasis on environmental and cultural resource management, preservation will become an increasingly important part of more airport development projects.

In fact, this group of listed and eligible properties is probably just the tip of the iceberg. As we know, the U.S. historic preservation process is often reactive. Airport operators will often not know that they are responsible for the preservation of an historic property until they have to initiate an identification/evaluation survey. In an interesting twist of historical fate, many of the nation's early commercial airports and military airfields (built during the 1930s-1940s) will be undergoing long-needed infrastructure redevelopment just as they cross the fifty-year threshold often used as the general yardstick for determining historical significance.

Historic Development of Washington's Airports

Given early federal interest in the military and postal service use of aircraft, it is not surprising the history of aviation in the Capital region began early. Within five years of the successful Kitty Hawk flight, the Wright Brothers' Military Fliers biplanes were demonstrated at nearby Fort Myers; (unfortunately these early flights also resulted in the world's first airplane crash fatality). Subsequent aircraft development and training of the initial cadre of military pilots took place in nearby Maryland, at the still active College Park Airport, the oldest continually operating airport in the country.

In fact, Washington National Airport was not the first commercial airport to serve the Nation's Capital. Located on the present site of the Pentagon, Hoover Field began operations in 1926. This airfield was one of many that sprang up across the country, in response to the rapid growth of commercial airlines capitalizing on the U.S. Postal Service relinquishing control of airmail traffic. The site was low lying, susceptible to flooding, and surrounded by federal property, which limited the chance of significant growth.

Although expanded in 1930 and renamed Washington-Hoover Airport, the airport remained below the minimal national standard. The "improved" airport also was hampered by other inadequacies: short sod runways, and landing obstructions from power lines, smoke stacks, and fuel tanks. Will Rogers once commented that you could always tell you were flying into Washington-Hoover, because it was the only airport in the world bordered by a cemetery and high-voltage power lines. Plagued by hazardous conditions and a number of fatal accidents, the early airport was soon considered to be unsafe and inadequate to face the Capitol's growing aviation needs.

Washington National Airport

Although conditions at the Washington-Hoover Airport slowly improved, by the late 1930s the growing threat of war convinced President Franklin Roosevelt that the Nation's Capital needed a new, modern airport. Like Coolidge and Hoover (who had both pushed for a new Washington Airport), Roosevelt found himself hampered by the 1926 Air Commerce Act, which limited federal involvement in commercial airport development. Roosevelt finally took decisive action in 1938, first by vetoing a bill to allow the expansion of Washington-Hoover and second by pushing the Civil Aeronautics Act through Congress. This act removed earlier limits on federal involvement in airport development. That same year, under the authority of the

new Civil Aeronautics Authority, a site on the west shore of the Potomac River was approved for a new airport.

Despite the fact that the current location for National Airport was suggested as early as 1927, it had taken nearly eleven years of debate and controversy before the site selection was finalized. The location was considered to be well-suited for a number of reasons, including easy access to the newly created Mount Vernon Memorial Highway, and proximity to the Post Office and the Federal Triangle buildings then being built across the Potomac. The proposed site was only ten minutes from downtown and the bulk of the land was already owned by the federal government.

The shallows of the Potomac provided an ideal landfill option that would be much cheaper than purchasing new land or relocating the nearby rail yard. Since the new airport would be constructed on filled land, there was built-in flexibility in the size, shape and dimensions of the resulting airfield. This allowed airport planners to incorporate up-to-the-minute engineering in the runway layout relative to the prevailing winds. The site also allowed over-water flight paths essentially free from runway approach obstructions. The airfield infill operation also allowed the runways to be elevated twenty feet above water level, above anticipated flood levels. In addition, the shoreline offered an excellent setting for a proposed seaplane terminal that remained an important (but unrealized) component of early airport plans.

Despite these advantages, the Gravelly Point site represented a remarkable challenge, as 527 acres of the 730-acre airport would have to created by dredging and filling the shallows along the Potomac shoreline. Utilizing four of the world's largest and most powerful dredges, over eighteen million cubic yards of fill was dug from the bottom of the Potomac River. At the same time, significant landside improvements were underway, with over four million cubic yards of fill being moved to create new construction sites, roadway alignments and parking areas. The Mount Vernon Memorial Highway, which followed the shoreline, was relocated to form the airport's western boundary. The process of dredging and filling the airport site was considered one of the significant engineering achievements of its day.

National Terminal Design and Construction

As the first federal airport, the design and construction of Washington National Airport represented a remarkable example of New Deal inter-agency cooperative effort. A special Interdepartmental Engineering Commission was appointed, with representatives of ten participating federal agencies. The new Civil Aviation Authority headed the engineering effort working with the Army Corps of Engineers, while the Public Works Administration lead the architectural effort hiring Howard Lovewell Cheney as the consulting architect.

The development of the design for the Main Terminal was long and controversial. The consulting architects expressed a strong preference for a striking, modern International Style building, which, they argued, embodied the futuristic spirit of aviation. This modernistic design direction was balanced and complicated by the desire of the federal government - represented by an Interdepartmental Engineering Commission and President Roosevelt - for a more classical design that would reflect the Neoclassical architectural style of the federal government buildings, as well as the rich Colonial heritage of the historic Virginia surroundings.

Eventually, compromise won out, and in December of 1939, a final design was approved. The proposed design represented a unique attempt to create a "modern" structure, which still integrated architectural references to the Colonial and Neoclassical style. The basic structure of the boxy, horizonal building with its large glazed curtain walls, cantilevered floors, and curved walls was clearly "Modern" in character. However, the symmetrical, stepped massing and simplified classical portico was thought to reflect Colonial elements from nearby Mount Vernon.

Being of wartime and federal construction, the building was designed to use economical materials to their best advantage. The exterior walls were cast in place using one-board forms and finished with a thin wash for a smooth finish. Although built from the most inexpensive material available, the use of innovative form work was seen to provide an opportunity for creative expression. The simple, modern form of the building was reflected in the terminal interior, which used a mixture of exposed concrete, hollow tile coverings and restrained ornamental details.

One of the most significant architectural elements of the design was the integration of specialized spectator facilities. The still-new phenomenon of commercial aviation garnered a high level of public interest, and a significant number of airport visitors came to watch airfield operations rather than to catch a flight. As a result, terminal design features reflected the importance of unobstructed views of the airfield. This included observation lounges that ringed the airside facade of the terminal. This focus on the visual connection to the airfield was carried into the interior of the terminal, through the use of an expansive glass window wall that ran the full length of the large Main Waiting Room. The use of a curved glass window wall was repeated in the elegant second floor Dining Room at the north end of the terminal. The excellent view of the airfield operations and a sweeping vista of the Monumental Core of the capital across the river made the airport restaurant a popular entertainment and sightseeing spot.

The terminal design included an innovative, "channelized" circulation plan, which provided for the horizonal and vertical separation of flight crews, passengers, spectators, baggage and service functions. A special access entrance was provided to allow VIP visitors to be spirited unseen into a Presidential Suite on the ground floor. The terminal also included modern technical facilities such as a state-of-the-art Airport Traffic Control Tower, with specially angled, tinted glass walls to minimize reflective glare; the tower operations were supported by an electric flight progress board and a sophisticated radio communications system. Constant weather information was provided by a custom-built weather station or mirador, located behind the tower. The mirador was outfitted with special retractable observation domes for the deployment of balloon-borne, radio-equipped, weather equipment.

In addition to the advances represented in the terminal, the airport hangars also represented the latest design developments. The hangars used long-span steel construction, supported by structural concrete, and incorporated a unique mix of sliding leaf and canopy hangar doors. Beyond these modern technical achievements, the functional streamlined design was in keeping with the design of the terminal. Although only one hangar (Hangar One) was originally designed and built with the terminal, the airlines expressed such an interest in renting space at the new airport that a supplemental Congressional appropriation was soon passed and six additional hangars (Hangers Two through Seven) of the South Hangar Line were completed by 1942.

Later Historical Development

Although National Airport was originally planned as a purely commercial operation, the airport served a critical military role during World War II. Formally designated as Washington National Army Air Base, the airport served as the Army Transport Command base for special military/diplomatic missions and the international transport of priority passengers, wounded, cargo and mail. The first military structures on the airport were the Army Transport Command hangar and a military Passenger Terminal/Fixed Base Operations unit constructed in 1944. However, the military continued to have a significant presence on the airport well after the end of the war. By the time the U.S. Army finally moved off the airport in the 1960s, much of the central airport was covered with military barracks, offices and support buildings.

As a result of the rapid development of jet aircraft during the 1950s, a Jet Engine Test Cell was built in the south end of the airport in 1956. This facility was probably the first U.S. facility specifically constructed to serve commercial jet-powered aircraft. The facility was constructed to provide testing/service facility to the fleet of Vickers-Viscount aircraft that were introduced at National Airport in 1954.

Due to limitations on major expansion, the clean lines of the Main Terminal became cluttered by a number of "interim terminals" and concourse extensions. The construction of the Metrorail track and station at the airport further restricted and cluttered the land side of the airport, worsening an already congested roadway and curbside system. These conditions provided a major impetus for the ambitious new construction and redevelopment plan embodied in the current Capital Development Program.

Preservation Planning
and the National Redevelopment Effort

Although National Airport was found to contain a number of National Register-eligible properties (Main Terminal, South Hangar Line, Hanger Ten/ATC Complex, DOT Complex, Jet Engine Test Cell and the Abingdon Plantation Site), they lack the unifying association necessary to be considered an historic district. Faced with a tightly circumscribed site and an inadequate Main Terminal space, the National redevelop-

ment plan focused on the construction of a major new 35-gate North Terminal and the wholesale redevelopment of the roadway access and parking systems. Although the new terminal would leave the historic terminal essentially intact, the extensive construction plan did result in direct and indirect impacts to a number of other historic structures. After careful study and long consultation, plans were developed and approved to avoid or mitigate the potential adverse effects.

Dulles International Airport
The need for a second airport to serve the National Capitol Region was recognized almost as soon as National Airport opened. Given the dramatic growth of commercial aviation, the continued significant military presence, and weather restrictions resulting from fog, the search for a second suburban airport site was soon underway. After careful consideration of numerous factors, the Civilian Aeronautics Authority acquired 10,940 acres of farmland near Chantilly, Virginia, thirty miles from the downtown airport.

Dulles Airport Design and Construction
Dulles International was the country's first airport designed specifically for the new "Jet Age." The project architect, Eero Saarinen, took a completely new look at the way a jet airport should operate. A central element in Saarinen's innovative design was the rejection of the traditional "finger" terminal design. He suggested the simple, yet revolutionary, approach of bringing the passengers to the aircraft, rather than taxiing the aircraft to terminal. By developing "mobile lounges" to move passengers, the terminal form was freed to express Saarinen's vision of a terminal that was as much a piece of monumental sculpture as a utilitarian building.

He designed a dramatic free span terminal building that provided an open interior floor plan. In order to provide operational flexibility, Saarinen outfitted the expansive interior gallery of the terminal with modular kiosks housing both ticketing/baggage counters and commercial concession space. Lacking permanent structural connections, these service modules could act like "furniture," and be moved, expanded, or reconfigured in response to changing operational requirements. The monumental terminal perched on a two-level concrete base that incorporated separate enplaning and deplaning roadways. Enplaning passengers arrived on the upper level and moved through the ticketing concourse on the upper floor and out to a mobile lounge docking berth for transport out to the planes on the airfield. The deplaning passengers arrived by a mobile lounge, took an escalator to the lower floor, passed through baggage pick-up and exited onto the lower deplaning roadway to access near terminal parking lots or ground transportation systems.

As the Main Terminal and Tower were the central focus of the entire airport, the remaining structures were specifically designed not to compete with the terminal complex. All buildings in the vicinity of the terminal were designed to blend into the surroundings. The major service buildings were constructed along two flanking service avenues offset to the east and west of the terminal. These ancillary buildings were simple rectangular structures, limited to one story and clad in vertically-ribbed medium grey metal siding. Structures outside of the terminal area could be higher than one story, but maintained the same rectangular design and grey exterior.

An elliptical parking area north of the terminal was constructed in a recessed bowl, so it would not intrude on the view of the terminal from the approaching roadway. The roadway system was designed to provide a carefully planned progression of views of the terminal. The visual sequence extended from the first glimpse of the tower a quarter of a mile away and culminated in a final grand sweeping perspective as cars entered the curving approach road. Even the landscape plan was a carefully integrated element of the overall architectural scheme, with a progression from less structured, natural plantings on the airport perimeter, to increasingly formalized groves of trees and shrubs in the vicinity of the terminal.

The expansive open gallery space of the terminal was formed by four massive glass curtain walls containing almost two acres of plate glass. The construction of the structural columns was a complex process utilizing intricate fiberglass and wooden forms and over fourteen tons of reinforcing steel per column. The striking sloped roof utilized a catenary support system with almost two thousand tons of precast concrete panels suspended from hanging steel cables. The control tower, overlooking the runways and airplane taxiways, was placed at the central bay behind the Main Terminal. The substantial Airport Traffic Control Tower, connected to the

Main Terminal by the South Finger, added a striking vertical element to the horizonal mass of the terminal. Both the South Finger and the Tower are constructed of concrete and glass, matching the Main Terminal.

Early designs for the mobile lounge were futuristic attempts to reflect the ultra-modern character of jet aircraft and the terminal. However, financial and operational considerations resulted in development of a more utilitarian approach. The final design married already existing vehicle design elements. The largest wheeled vehicles ever built at the time, the lounges were formed by mounting a train-like cab on top of a modified tank chassis.

Preservation Planning and the Dulles Redevelopment Effort

Almost from the moment it was built, Dulles was recognized as Saarinen's greatest architectural achievement. Although he did not live to see it completed, the architect felt the design was his "best work." The American Institute of Architects posthumously awarded Saarinen its Gold Medal Award in 1962. In 1976, the American Institute of Architects included Dulles Airport on its list of fifty of the most significant American structures built since the American Revolution. It is also notable that in 1978, Dulles was one of a few buildings deemed to be eligible for the National Register of Historic Places, before it was fifty years old.

Since all but one of the original structures are still standing (one structure was recorded, removed and then reconstructed in a mirror location), Saarinen's airport retains a very high level of architectural integrity. This fact has lead to the establishment of a National Register Historic District. In addition to the acclaimed Main Terminal, twelve existing service buildings, the original mobile lounges and even the Parking Bowl were designated as significant historic properties. The Main Terminal was determined to be eligible for the National Register under two separate criteria: Criterion A (association with significant events - development of Jet Age Commercial Aviation) and Criterion C (representing a masterwork by an master architect).

The planned capacity for the initial construction of the Main Terminal was eight million passengers; currently the number of annual passengers exceeds eleven million. The challenge was to plan for an expansion that would allow the terminal to not only meet current demand, but be flexible enough to respond to the projected increase in passenger volume, while preserving the unique architectural character of the terminal and its surroundings.

Fortunately, part of Saarinen's genius was his foresight in recognizing the potential need for expansion. His master plan clearly showed his intent that the Main Terminal be expanded, in kind, from both ends, resulting in a doubling of the original length of the terminal. In fact, there are indications that was the original planned length of the building, but the design was shortened due to a lack of construction funds. As a result, the basic element of the Authority's terminal expansion plan not only represented the realization of Saarinen's expansion plan, but the ultimate realization of the architect's original design intent.

Although the existence of the Saarinen Master Plan provided clear design direction to guide the expansion, the project could not be accomplished without adverse effects to some original elements of the building, and this presented a profound preservation dilemma. Through long consultation, consensus was finally reached on an expansion plan that allowed for the preservation of the unique architectural character of the Main Terminal and limited unavoidable adverse effects.

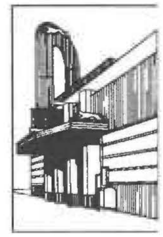
Conclusion

A comparison of the development of these two historic airports, and their subsequent preservation programs, provides a number of interesting contrasts. In each case, the unique historical origin of the airport had a notable influence on its later development, the nature of its historic resources, and the specific focus of the historic preservation program.

National Airport was built during the early phase in the development of commercial aviation. During this early period, there was little realization of the potential for the explosive growth of commercial air travel, and the airport was designed without benefit of a plan that provided for a substantial enlargement of terminal facilities. Built adjacent to the Nation's Capital, on a tightly circumscribed man-made site, the airport was hampered by limited available land area and restrictions on future growth (the Potomac River and the Mount Vernon Memorial Highway). Space limitations and the lack of a master plan resulted in the haphazard construction of a clutter of interim facilities and additions. Land constraints also

resulted in the removal of earlier facilities as an increasing proportion of the airport was taken up by new roadways and surface parking. Eventually, the space limitations of the historic (but outdated) existing terminal and the over-burdened ground transportation system required the construction of a brand new terminal and ground access network. This new construction necessarily resulted in the removal - after Historic American Engineering Record (HAER) documentation - of some historic structures. As a result of its unique historic development, the preservation program at Washington National Airport is focused on attempts to avoid or mitigate the effects of new construction on existing historic structures.

In contrast, Dulles International Airport was built in a later generation of airport development. Having learned from past mistakes, the airport design explicitly addressed the need for future expansion. The selected terminal design was founded on the concept of operational flexibility and planned growth. Built on an expansive, unrestricted site, there was ample space for future airfield and support facility development. The Saarinen master plan provided the blueprint for controlled growth to meet long-term needs. While there were specific developments not adequately addressed in the original master plan (capacity limitations of the mobile lounge passenger transportation system and unanticipated terminal space requirements for security screening), a revised plan was developed that successfully resolved these conflicts while remaining true to the basic Saarinen design. By providing for new facilities (sub-grade security level and underground people mover system) below the original ground floor level of the Main Terminal, South Finger and the east/west expansions, these new demands can be met without significantly effecting the unique architectural character of the Saarinen's terminal. While preservation challenges still remain, the Dulles International Airport expansion plan represents a carefully crafted program that allows this vital airport to grow to meet future needs without sacrificing its unique architectural character.



The Expansion and Preservation of Dulles and National Airports

Mary Harding Sadler
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Virginia Department of Historic Resources
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Introduction
Major expansions now under way at National (1941) and Dulles (1962) Airports in the outskirts of Washington, DC, raise important issues about preserving significant twentieth-century landmarks. Historic preservation at these pivotal airports, both landmark gateways to America, was formally initiated with a Programmatic Memorandum of Agreement in 1987. This agreement between the Federal Aviation Authority, the Advisory Council on Historic Preservation, and the Virginia Department of Historic Resources (the State Historic Preservation Office, or SHPO) assigned responsibility for historic preservation at Dulles and National to the Metropolitan Washington Airports Authority, the principal tenant-manager.

In 1988 the proposed demolition of Hangar One at National Airport was the agreement's proving ground. The Airports Authority needed to build structured parking to house taxis on the site of the airport's first hangar. The SHPO urged the hangar's preservation. Heated discussions ensued between the SHPO, the Airports Authority, and the Advisory Council. Ultimately, though the hangar was lost and the taxi holding structure built, a new agreement - a memorandum of agreement specifying future preservation commitments - was struck.

Around the same time that the demolition of Hangar One was being negotiated, the Airports Authority began to consider major expansions of both National and Dulles Airports. Because of the controversy generated by the Authority's first preservation-related undertaking, the Airports Authority initiated consultations with the SHPO and with the Advisory Council early in the planning stage for each of the expansions. The Airports Authority mandated that the architectural firms designing both expansions - Skidmore, Owings and Merrill (SOM) at Dulles and Cesar Pelli at National - hire historic preservation specialists as part of the team of consultants.

Transportation Prototypes
The organizational scheme for National Airport is based on plan types first established in train stations and later found in bus and subway stations. The vehicle and the traveller are brought as close together as possible at a gate, the doorway between the station (or terminal) and the transportation vehicle. Because of the enormous scale of airplanes, this airport prototype results in attenuated structures punctuated by clusters of radiating docking facilities. Hence at National there are a series of connected additions to the original main terminal (increasing in scale and complexity), which recognize the growing size and number of airplanes serving the airport. The main terminal is divided into a series of sub-terminals with dozens of gates. The traveller walks longer and longer distances to reach the plane awaiting him at the gate and its accompanying lounge.

At Dulles, architect Eero Saarinen developed a new prototype that involved transporting the traveller from the main terminal to his plane by means of a commodious "mobile lounge" - really a highly specialized bus. The goal was to simplify the traveller's "way-finding" and to reduce the distance the traveller was required to walk by taking him directly from the terminal to the plane on the airport's apron. The original mobile lounges were fitted with an adjustable ramp which adjusted to the level of the plane's doorway; later the development of the "Plane

Mate" allowed travellers to be lifted from the ground to the entry level of even larger airplanes. The invention of the mobile lounge allowed the main terminal to remain virtually uncompromised by incompatible additions like those appended to National's main terminal.

Happily, the architects involved in both airport expansions respect the fundamental principles employed by the airports' original designers. At National the new (North) terminal will continue the organizational scheme of bringing travellers and airplanes together at gates that project from the terminal in a series of "fingers." The expanded main terminal at Dulles will ultimately channel travellers to a subterranean people-mover that will transport them to a midfield terminal where their planes are docked. The infamous mobile lounges will, in the interim, continue to transport passengers from the main terminal to the midfield terminal.

Site Considerations
National Airport has been constrained from the outset by the intense development that characterizes all property at the edge of the District of Columbia. The airport was developed on the riverfront, with the runway pavement supported on fill dredged from the Potomac. Its neighbors were a Transportation Department materials testing and development center; the historic ruins of the Custis plantation "Abingdon"; Alexandria's railyard; and, close by on the north, Hoover Field, on whose site the Pentagon was constructed. The same factors that mandated construction of the airport on this site ultimately threatened to choke its existence. At National there is a constant struggle to balance the spatial and functional needs of the airport with the need to protect and preserve important landmarks like the Main Terminal and the Abingdon Plantation ruins. The Airports Authority is also required to protect views to and from significant properties within Washington's Monumental Core, including nearby Arlington Cemetery and adjacent George Washington Memorial Parkway.

Dulles's site is the opposite in character. Located twenty miles from the District, where Fairfax County meets Loudoun County, this airport was developed on thousands of acres in what was then unspoiled countryside. For the first two decades of its existence, Dulles's remote location threatened its viability. Today the development lapping at its edges has brought a growing number of travellers to Dulles's heroic main terminal. The expansion of this once under-utilized airport is critical to its continued use. Historic Sully Plantation, located at the airport's edge and the only National Register property visible from the Dulles campus, is not affected by the airport's planned development. Now the airport itself, the acknowledged masterpiece of Eero Saarinen, is considered an "historic property," although it was constructed less than thirty-five years ago. The challenge here is to extend and develop the formal vocabulary Saarinen used to order this landscape, so that the airport has a viable future.

The Airports' Design and the Details Within
National Airport was designed by Howard Lovewell Cheney, a federal architect charged with producing documents for the construction of the capital's first airport. Cheney's architectural team considered many sources for the airport's design, some totally contemporary and some harking back to America's colonial past. His design, executed in cast-in-place concrete like Dulles, could be labelled Streamline Moderne or stripped-down Neoclassical. The design clearly references Mount Vernon in its porticos. Its formality is derived from symmetrical massing and monumental scale. On the interior, terraced seating areas and the vast window wall welcome travellers and tourists to the theater of air travel. The understated ornament, etched in glass and cast in aluminum, illustrates symbols of travel and of flight. Robinson & Associates, historic preservation consultants for National's expansion, uncovered fascinating documentation of the airport's interior design, including the drapery frabic and china patterns designed for the main dining room. Small-scale preservation concerns have focused on retention of discrete details like these.

The principal concern at National, where a new, free-standing, main terminal is under construction, has been to ensure the preservation of the historic main terminal by assigning to it a compatible new use. It is essential that the original terminal not become a mere passage from one end of the airport to the other. Current thinking is that the original terminal will be used for commuter flights, where docking facilities require significantly less space. The main dining room, restored to its original configuration, will likely be converted to a VIP lounge with facilities for meeting the press.

Unlike National, where demand has always

outpaced the development of new facilities, Saarinen envisioned the expansion of Dulles when he conceived the original airport design. His 1962 Master Plan for the airport illustrated the main terminal's ultimate enlargement. The elongated plinth of the main terminal anticipates expansion; it is, even now, long enough to support the doubled length of the expanded terminal. As at National, Dulles was constructed with a limited palette of economical materials embodying contemporary design principals. In contrast to the overall design at National, the Dulles airport campus, including its long approach drive, represents the relatively faithful implementation of Saarinen's single-minded vision. The character of National Airport as a whole - when compared to Dulles's consistently ordered layout - is fractured and multi-faceted.

The design team for Dulles's expansion was charged with fulfilling the Saarinen vision while overcoming that vision's shortcomings at the same time. Saarinen could not have predicted the size of today's jumbo jets, nor could he have guessed at the security measures prompted by international terrorists and drug smugglers. Saarinen's radical mobile lounge was at best a limited success. SOM resolved many preservation concerns by placing people movers and security devices below ground. The South Finger and its reflecting pool are sacrificed for the installation of vertical circulation shaft leading to these new functions. As a result of this trade-off, the purity of Saarinen's sculptural metaphor for flight is maintained.

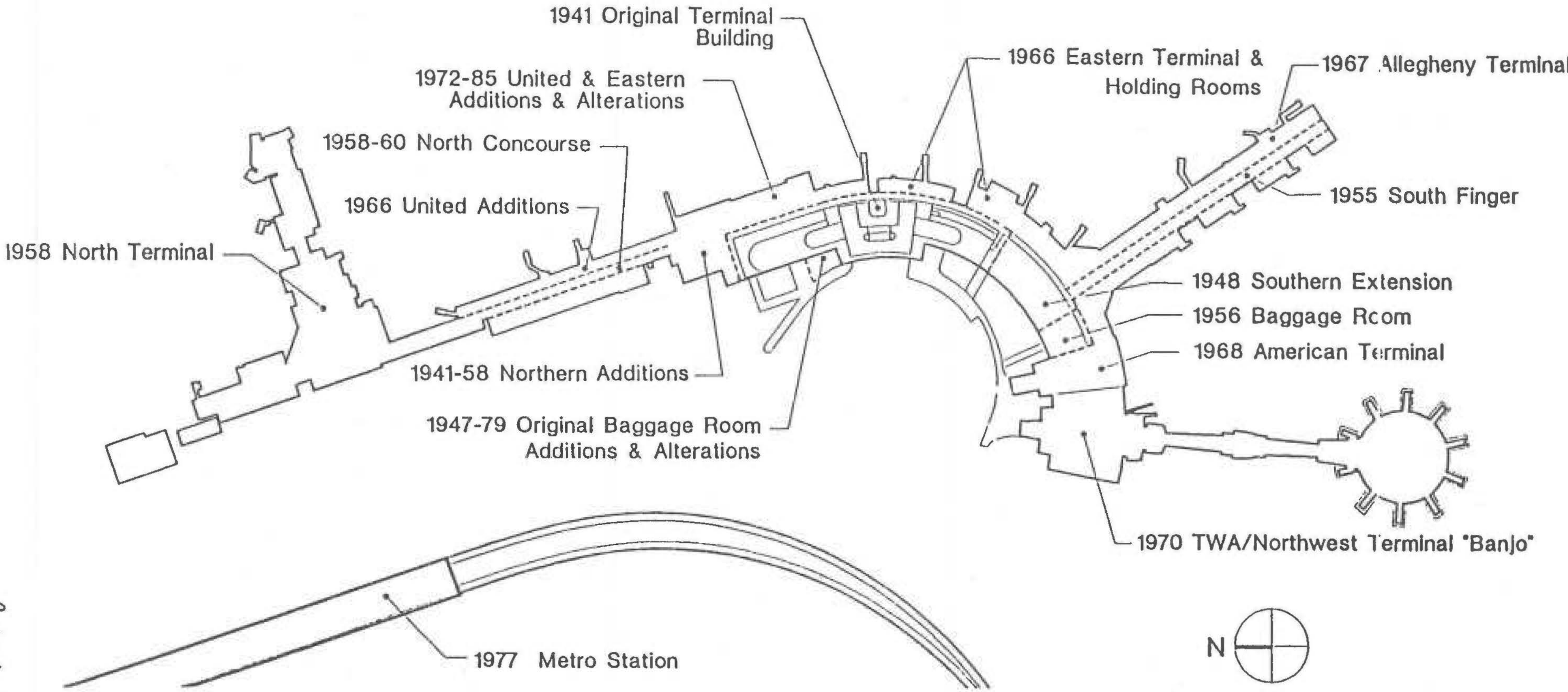
Saarinen's control over the original design of the airport was so complete that it included specification of the typography to be used for all signs on the airport campus. This font will be replicated in new signs for the airport, which now must be developed in compliance with the Americans with Disabilities Act and with new international "way-finding" conventions. Preservation debates included open discussions of whether the original terrazzo floors, now cracked in several areas, should be completely replaced or repaired and retained. The floors will be repaired wherever possible. They will provide an easy demarkation for the curious of the seam between the original terminal and its two new wings. It was also debated whether the original railings should be augmented to meet code or whether they should be replaced with new railings that would both meet code and respect the original design. The railings will be replaced. The question was continually encountered of whether the 1960s building materials had any intrinsic significance, or whether the entire significance of the airport resided in Saarinen's ground-breaking design. Ironically, implementation of the Saarinen Master Plan necessarily results in the loss of substantial amounts of original building material. Is this a significant loss?

Conclusion

The Airports Authority handled its consultation requirements in an extraordinarily organized fashion. Once the significance of each airport was established and agreed on, the Authority incorporated the resolution of preservation concerns into the complex management timetable for the expansion programs at both National and Dulles. Monthly meetings and site visits were scheduled at each of the airports. Each of the airports' design teams included a preservation consultant - Judith Robinson of Robinson & Associates at National and Hyman Myers of the Vitteta Group/Studio Four at Dulles - who researched the history of the two airports and inventoried all original features and materials remaining at each. Overall management of historic preservation concerns was provided by Henry Ward of Parsons Management Consultants.

Because of the regular presentations and roundtable discussions of preservation issues among critical representatives of the design teams and preservation agencies, project planning and development were never derailed by unexpected controversies. Issues likely to cause debate were laid out in detail by appropriate specialists. The common goal of preservationists and design teams was to solve the problem. In some cases, all agreed that significant features must be lost. In other instances, the Airports Authority (and the Federal Aviation Administration) agreed to spend significant additional funds so that significant features, like the miradors of National's main terminal, would be preserved.

The two design teams undertook major expansions at National and Dulles Airports fully understanding the architectural and symbolic significance of these very different, twentieth-century landmarks. As a result, Washington's two airports will enter the twenty-first century with enhanced significance and greatly expanded services.


1941 Original Terminal Building
1972-85 United & Eastern Additions & Alterations
1958-60 North Concourse
1966 United Additions
1958 North Terminal
1966 Eastern Terminal & Holding Rooms
1967 Allegheny Terminal
1955 South Finger
1948 Southern Extension
1956 Baggage Room
1968 American Terminal
1941-58 Northern Additions
1947-79 Original Baggage Room Additions & Alterations
1970 TWA/Northwest Terminal "Banjo"
1977 Metro Station
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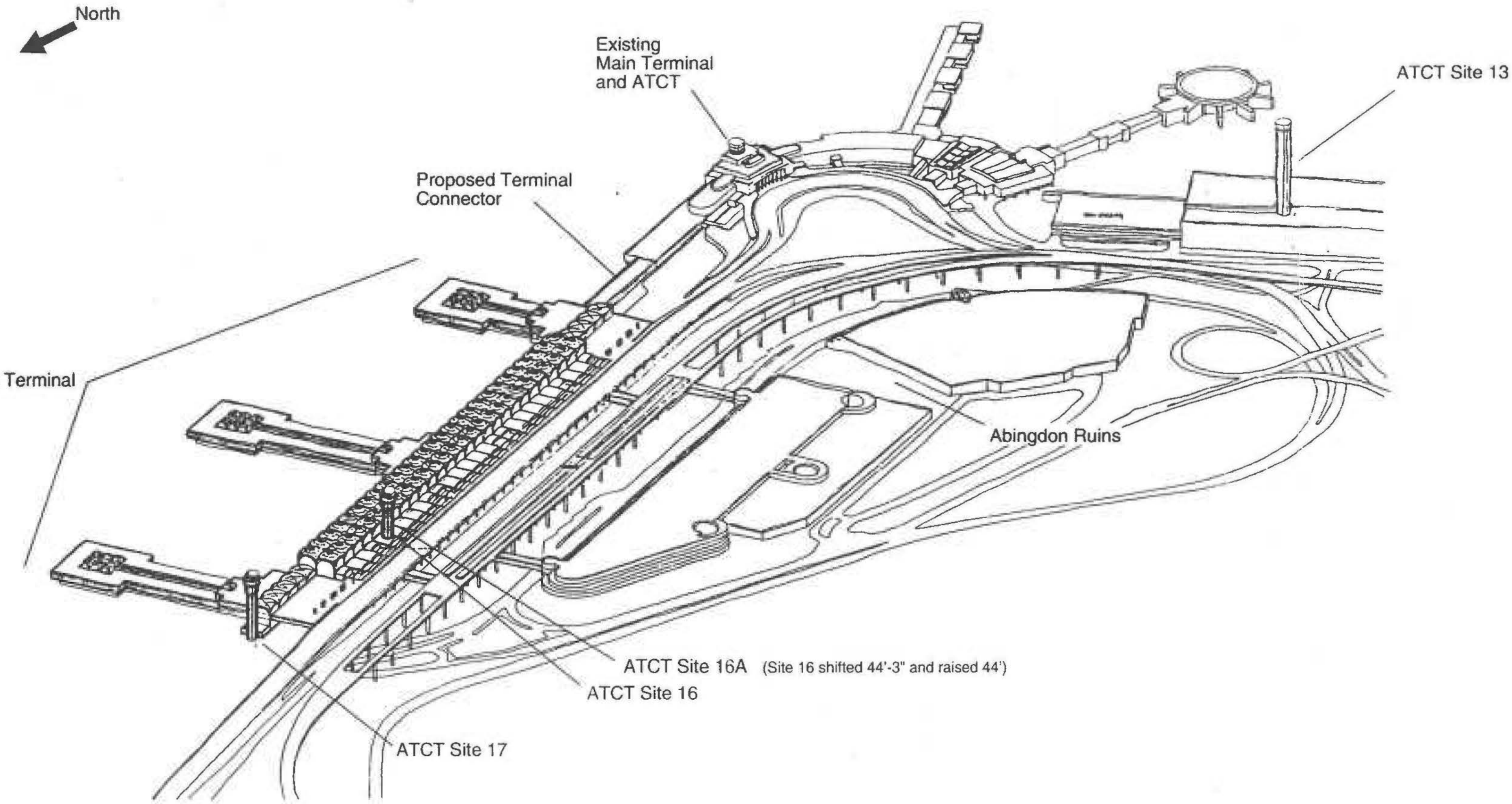

Source: Design Architect - Cesar Pelli & Associates
Prepared by: Ricondo & Associates, Inc., 1993

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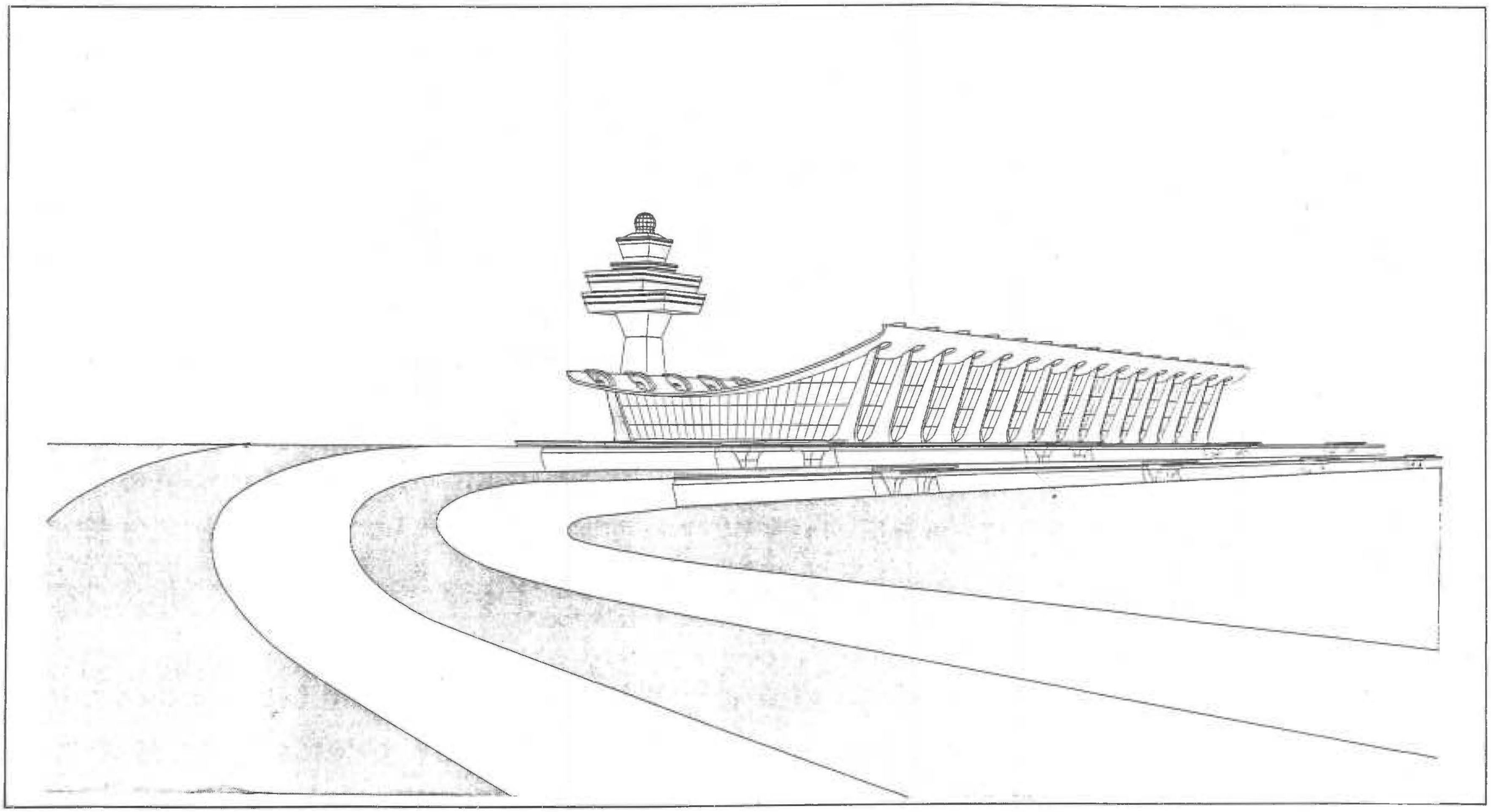
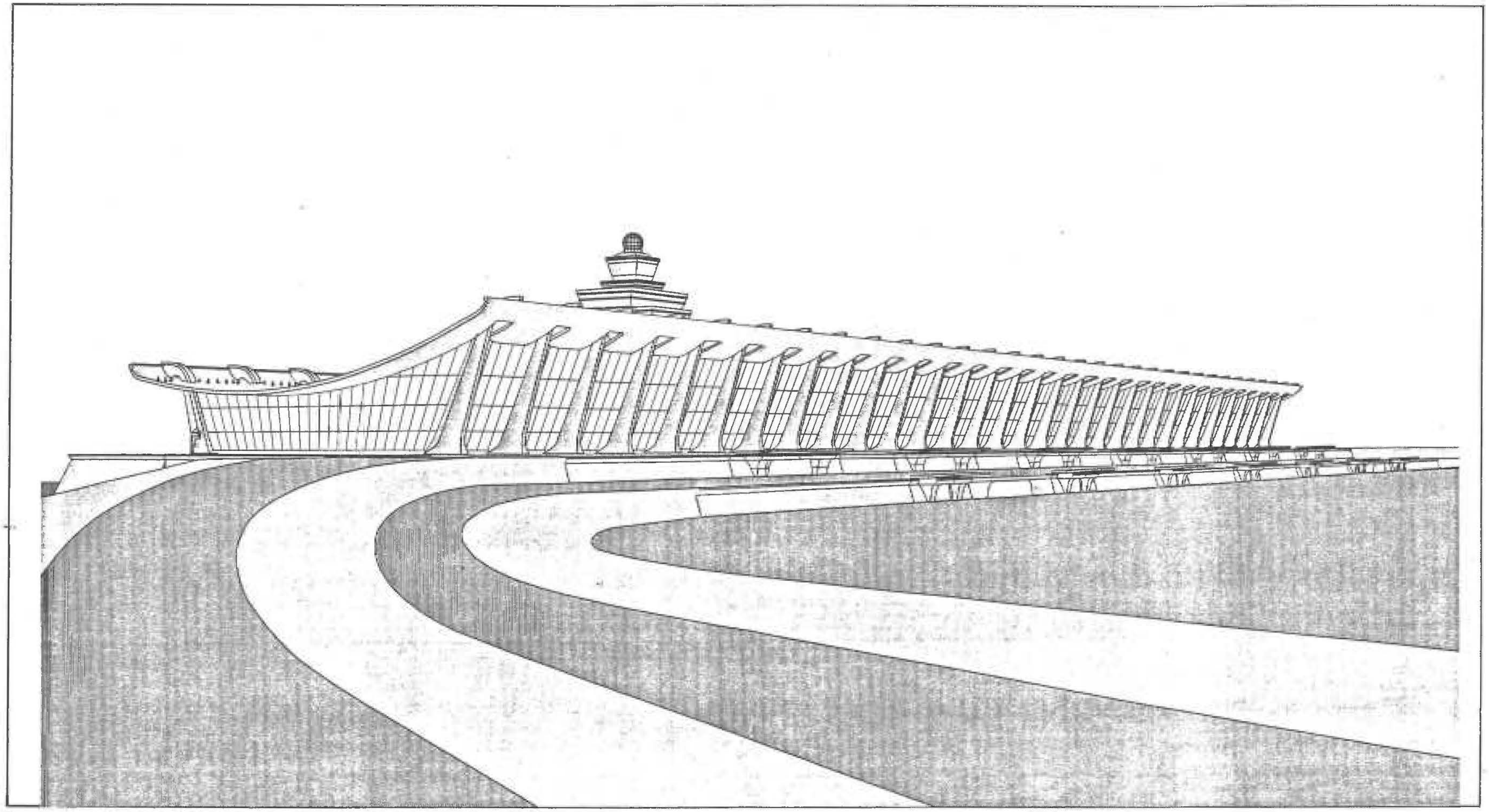


PERSPECTIVE OF EXISTING NORTH ELEVATION

WASHINGTON DULLES INTERNATIONAL AIRPORT
MAIN TERMINAL EXPANSION

February 2, 1990
SKIDMORE, OWINGS & MERRILL



PERSPECTIVE OF PROPOSED NORTH ELEVATION

WASHINGTON DULLES INTERNATIONAL AIRPORT
MAIN TERMINAL EXPANSION

February 2, 1990
SKIDMORE, OWINGS & MERRILL

Reviving Route 66

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Williams, Arizona
Board Member, Society for Commercial Archeology
and Historic Route 66 Association of Arizona

Introduction
Something about Route 66 fascinates people. It might be the book or movie versions of *The Grapes of Wrath*, the Bobby Troup song "(Get Your Kicks On) Route 66," two guys in a Corvette racing to adventure on TV, a personal memory of an exciting trip, or maybe something more esoteric like highway engineering or geography.

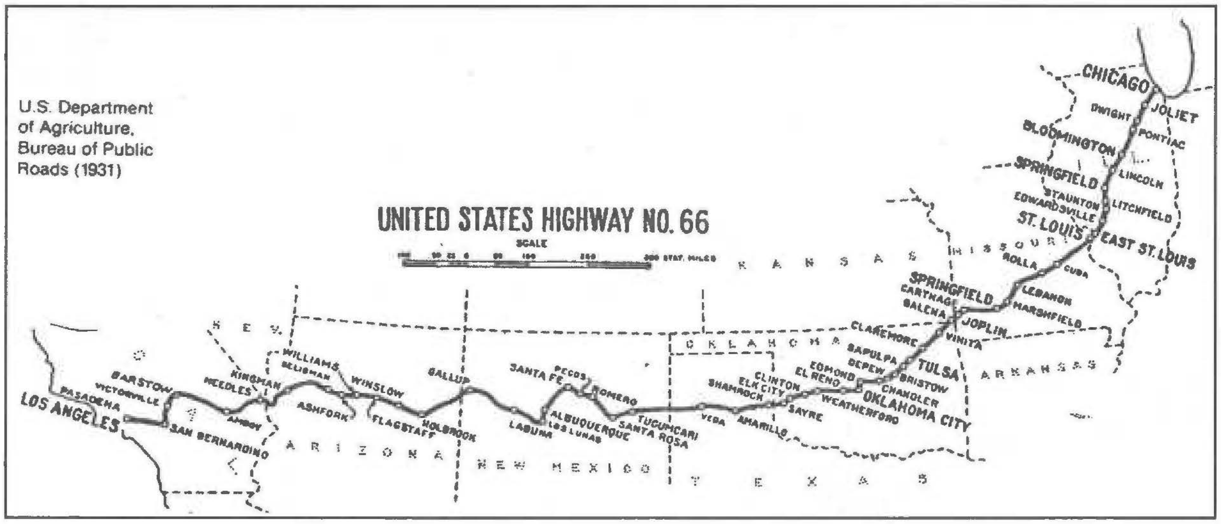
Even though the last Route 66 town in America - Williams, Arizona - was bypassed by the interstate highway system over a decade ago, Route 66 is perhaps more famous today than ever. Its place in American popular culture is cultivated by a diverse collection of Route 66 aficionados. This paper reviews current efforts to preserve and promote Route 66, with an emphasis on Arizona.

History
The story of US Route 66 is not very different from that of other early highways. It emerged in the 1910s from a patchwork quilt of dirt tracks and took its final form in 1926, when it and every other federally-funded American highway received a number. US 66 ran from Chicago to Los Angeles through Illinois, Missouri, Oklahoma, Kansas, Texas, New Mexico, Arizona, and California.

The US 66 Highway Association soon came into being to lobby for road improvements and to promote travel on the highway. Aside from their efforts, Route 66 became part of America's folklore because it was in the right place at the right time. Sweeping historical events made it a twentieth-century pioneer trail. It led Depression-era migrants from the ravaged Dust Bowl to the golden land of opportunity, California. John Steinbeck called it "the road of flight." In World War II, military convoys carried soldiers down Route 66 to desert training sites and workers to munitions factories. After the war, if you planned to motor west, Route 66 was "the highway that's the best." Vacationing travelers stimulated a cottage industry of gas stations, motels, cafes, curio shops, and various roadside attractions. Frank Lloyd Wright characterized Route 66 as "a giant chute down which everything loose in this country is sliding into Southern California."

Today's interstate highways make it easy to be nostalgic about Highway 66. Few people remember that by the late 1950s, it had a less catchy nickname - "Bloody 66." Traffic jams and head-on collisions were common. Bumper to bumper traffic had transformed quiet turn-of-the-century towns into noisy, smelly, visually jarring, and dangerous commercial strips. In response to this, and for military purposes, Congress authorized the construction of limited access interstate highways in 1956. Bit by bit, Route 66 was replaced by five different interstates, much to the joy of the motoring public and the chagrin of Main Street businesses.

Even the threat of a bypass had a negative effect on those Main Street towns. Business owners decided not to invest in improvements, believing that they would have to close as soon as any bypass came. Buildings often escaped "remuddling" such as facade sheathing that obscured or destroyed original features, but Route 66 also began to look rather seedy.



Map of US Route 66, extending from Chicago to Los Angeles. (Reproduced from an AAA cover map.)

Route 66 west of Williams, Arizona, in the mid-1920s. The winding, narrow roadway wasn't completely paved until 1937. (Photo courtesy of the Arizona Department of Pubic Relations Library and Archives)

Route 66 in Williams, circa 1938. The "Main Street of America" passed through many similar towns between Chicago and Los Angeles. (Photo courtesy of the City of Williams)

A 1942 Route 66 postcard. (Teri A. Cleeland collection)

Commercialism has always been a big part of Route 66. (Photo courtesy of Teri A. Cleeland)

By the late 1970s, Route 66 turned historic main streets into unattractive commercial strips. (Photo courtesy of Williams News)

On October 13, 1984, the last stretch of Route 66 in America was bypassed at Williams, Arizona. Suddenly, traffic through town decreased from a flood to a trickle.

Beyond the Bypass

The predicted economic disaster did not occur in Williams, though. City officials set the groundwork for downtown revitalization the same year the bypass occurred by nominating the downtown to the National Register of Historic Places. Enrollment in the National Park Service's Certified Local Government program as well as the National Trust for Historic Preservation's Main Street program has brought grant monies and technical expertise to the community of 2,500. A few years after the bypass, a vintage steam train renewed service to the Grand Canyon, sixty miles north. Recently, the City and the US Forest Service rehabilitated a 1901 train depot into a visitor center, with planned exhibits on Route 66 and its predecessors. In the coming year, the historic district will be expanded to include Route 66-related properties. Slowly, but surely, Williams has come back, blending its pedestrian-oriented railroad-era historic district with an exuberant automobile-inspired Route 66 commercial strip.

Seligman, Arizona, was one of many other small communities that suffered from the loss of highway traffic. However, some people began to notice travelers driving through just to find Route 66. In 1987, a group of twelve decided to form the Historic Route 66 Association of Arizona, which has brought world wide attention and some measure of prosperity back to the state's piece of the historic road. Now the other seven states, and even a few foreign countries, have Route 66 associations, too.

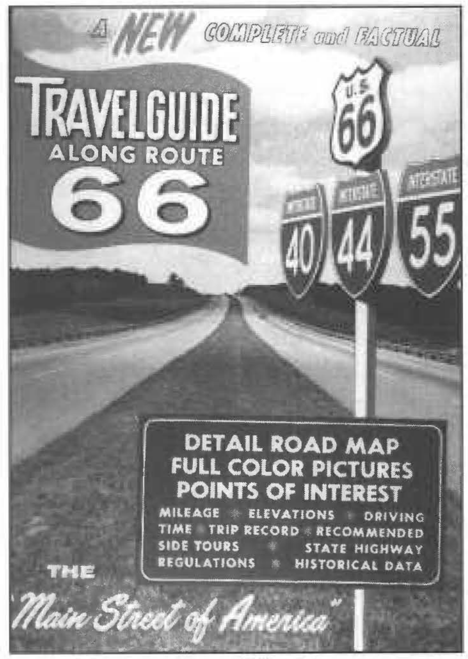
These associations tend to function much as the original one did, promoting Route 66. They offer trip planning, sponsor car tours and special events, sell merchandise, publish newsletters, and respond to media inquiries. Route 66 is a worldwide phenomenon, and interest is keen in Japan and in Europe, especially France, Germany, and Belgium. Most enthusiasts relate their interest to personal memories of traveling the highway in its heyday or finding a genuine piece of Americana along Route 66.

It seems like human nature to want a token of an experience. A plethora of Route 66 souvenirs is there to meet the need. You can buy Route 66 T-shirts, jackets, patches, signs, earrings, watches, refrigerator magnets, pins, pens, mugs, maps, and more. There are Route 66 videos, a Route 66 magazine, and Route 66 books—which comprise a valuable library of recorded oral history.

Despite the availability of abundant Route 66 sales merchandise, the very people who love the road are stripping it for souvenirs. They take what artifacts they can find, including highway markers, bits of the road, and - mostly - signs. According to one dealer, authentic Route 66 signs have tripled in price over the past three years, most now selling at between five hundred and thirteen hundred dollars. Even modern commemorative signs that carry the federal highway shield shape are stolen. The Kaibab National Forest installed twenty such signs to mark an auto tour, and within a week sixteen were literally ripped off, including some poles. Souvenir hunters even peeled little stickers off bicycle tour markers. This has been the experience wherever similar signs have been installed along the route.

Each state Route 66 association prints a newsletter. (Photo courtesy of Teri A. Cleeland)

The US 66 Highway Association promoted travel through its state organizations. (Photo courtesy of the Arizona State Historic Preservation Office)



The US Highway 66 Association continued to identify Route 66 even after the interstates appeared. It was renamed the Main Street of America Association in 1970 and disbanded in 1976. (Photo courtesy Teri A. Cleeland)

Some signing methods have been successful. Signs posted in frequently traveled areas, on private property, or protected behind barbed wire fences are less likely to be stolen. Signs without the shield shape are rarely taken, probably because they are so unattractive.

Route 66 organizations have the power to influence visitor behavior through education. Their newsletters provide a forum for preservation information, in addition to personal stories, advertising, and trip planning. Associations assist in "pocketbook preservation" by highlighting places to visit. This can maintain businesses, stimulate restorations, and generate sales tax revenues in economically depressed communities.

Special events are a fun way to draw media attention and provide funding for various causes, including some that are unrelated to Route 66. Events have supported organization operations, rehabilitations, roadside clean-ups, a Ronald McDonald House, high school athletic programs, and even AIDS research.

Current Route 66 Activities: A State by State Review

Arizona Unique among state organizations, the Historic Route 66 Association of Arizona has one full-time and one part-time staff person, supported by an average 1,000 person membership, newsletter advertising, merchandise sales, and special events. The annual Fun Run down Route 66 gets larger each year. Last spring, 653 cars entered the event, generating over twelve thousand dollars in profit for the organization.

The Arizona Department of Transportation recently designated nearly all of Route 66 a State Historic Roadway, which has brought recognition and interstate exit signs to all the small towns along the way.

Seven sections of Route 66 through the Kaibab National Forest were listed in the National Register of Historic Places in 1989. These include examples of abandoned roadway, rural stretches open to traffic, and a section within the City of Williams. The context for the multiple property nomination included the entire state.

National Register listing provides protection to these sections of Route 66, because they must now be considered during project planning. Potential adverse impacts to the resource that have been mitigated or avoided include timber skidding, ranching activities, road reconstruction, heavy equipment hauling, and burying of a telephone cable.

The Kaibab National Forest has developed a Route 66 auto tour and two mountain bicycle loop rides that retrace different alignments of Route 66 now closed to motorized traffic. Both tours have brochures along with directional and interpretive signing. The Forest has a programmatic agreement with Coconino County for management and maintenance of National Register-listed sections of Route 66 that are still open to traffic. It specifically lists construction and maintenance activities, their potential effect to the property's integrity, and stipulates when consultation with the State Historic Preservation Office (SHPO) is required. This agreement allows the County to perform routine maintenance without time-consuming consultation procedures, yet alerts both parties to activities that could have an adverse effect and require consultation.

The Bureau of Land Management (BLM) recently designated the winding stretch of highway in western Arizona between Kingman and Oatman a Backcountry Byway. They have installed directional signs and interpretive kiosks at the entries. Tour brochures were produced in partnership with private industry.

A cooperative agreement between BLM's Kingman Resource Area and the Historic Route 66 Association of Arizona includes semiannual litter clean-ups, assistance with interpretive signs and brochures, and vandalism patrols.

In May 1994, the Arizona SHPO convened a Route 66 conference that brought together government officials, business owners, preservation advocates, and others to discuss ways to focus their efforts in preserving and promoting the road. As a result, the SHPO has agreed to sponsor a Route 66 survey using funds generated by the state lottery. Inventory is the first step in a multi-year effort to preserve and interpret Route 66 across Arizona.

Illinois The Illinois Department of Transportation, in cooperation with the Illinois SHPO, has funded a comprehensive survey of Route 66 and related properties outside the Chicago metropolitan area using Intermodal Surface Transportation Enhancements Act (ISTEA) funds. A National Register context and nomination of five segments will be part of the document to be released in May, 1995. Two interpretive centers - a northern one in Lockport and a southern one near Hamel - are being installed as part of this project. The report will recommend that smaller interpretive facilities along the route be developed by the public and private sector. The entire route through Illinois should be signed by the spring of 1995. Illinois has a dynamic Route 66 Association, with car tours and other activities.

The Route 66 Auto Tour through the Kaibab National Forest offers spectacular views. The sign in the foreground is one of many stolen from along the route. (Photo courtesy of USDA Kaibab National Forest)

Missouri The Missouri SHPO sponsored a grant to the Missouri Route 66 Association a few years ago to survey Route 66-related properties. Some two hundred survey forms have been completed in this ongoing project. The Coral Court motel in St. Louis has recently been the focus of preservation efforts. Property values have skyrocketed, making acquisition of the Streamlined Moderne landmark a challenge. The Coral Court Preservation Committee has teamed up with the Missouri Route 66 Association to explore preservation options. The groups raised funds to produce a development prospectus for this significant complex. At the time of this writing, no developers have come forward to preserve the structures. The association has also requested ISTEA funding through the Missouri Highway and Transportation Department for Route 66 Scenic Byway status and enhancements such as wayside parks, signs, and mapping.

Kansas maintains a small but vigorous Route 66 association. With only thirteen miles of the old road, Kansas was the perfect location for the half marathon held there in the fall of 1994. Part of the day's activities included rededication of the 1923 Brush Creek Bridge, a steel reinforced arch structure saved from demolition through the association's efforts.

Oklahoma The Oklahoma SHPO funded a grant to the University of Oklahoma that produced a National Register multiple property nomination of twenty-four sites, including a segment of roadway measuring nine feet wide. The Will Rogers Hotel in Clairmore is also being considered for nomination. The Oklahoma Historical Society recently received an ISTEA grant to dedicate a Route 66 museum in Clinton. The active Oklahoma association and a new national organization called the Route 66 Federation will co-host the first national Route 66 conference in Oklahoma City in June 1995. Intended to bring all the state organizations together, the conference will feature several speakers and special events.

Texas The City of Amarillo, Texas, recently completed a National Register nomination for the "US Route 66-Sixth Street Historic District", which includes a stretch of the highway and thirteen blocks of associated commercial development dating up to the 1950s. The communities of McLean and Shamrock are actively rehabilitating their Route 66 streetscapes. At the request of the Old Route 66 Association of Texas, the state Department of Transportation has recently agreed to sign the entire route by April 1, 1995. It has even guaranteed to replace any stolen signs.

New Mexico The New Mexico SHPO and State Department of Tourism matched funds to finance a statewide survey and inventory of properties associated with Route 66 in 1992. The survey resulted in the listing of seventeen properties in the National Register. A terrific guide to Route 66 roadside attractions in Albuquerque was published in 1993, with funding from the City, SHPO, and Department of Tourism. The New Mexico Route 66 Association, not as active as it once was, is still viable.

California The California Historic Route 66 Association is active, with a newsletter and many events. They are working to develop tours of Route 66 on vintage buses. Through their efforts, much of the road has been signed. The association has entered the political fray, protesting a landfill that is planned for the Amboy area. Unlike in other states, the California SHPO is not involved in Route 66 activities.

A National Perspective

All of the state Route 66 associations share similar frustrations. As with any volunteer group, burn out is endemic. Leaders come and go. Financial interests can bring about charges of profiteering. The associations are so involved in keeping themselves afloat, they have little interaction with their fellow organizations across state lines. Nevertheless, they are a tremendous resource of energy and knowledge that, if unified, could become even more powerful agents of preservation.

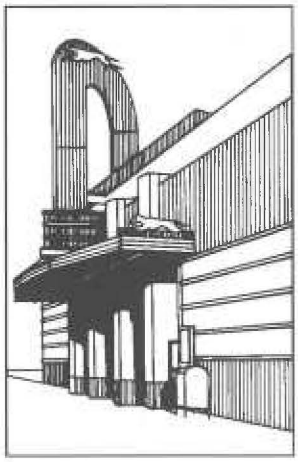
An attempt to address this lack of national coordination and to explore preservation issues came in 1990, with passage of the Route 66 Study Act. It directed the National Park Service (NPS) to recommend to Congress ways of commemorating and preserving Route 66 throughout the country. An NPS resource team from the agency's Denver Service Center released several possible alternatives and conducted public meetings along the road in the spring of 1993. The response was striking in its diversity, indicating a lack of common vision among Route 66 supporters. For instance, preservation of Route 66 meant creating a linear national park to some, and providing tax breaks for T-shirt shops to others.

Such lack of consensus is only one of the difficulties faced by NPS planners. Complex manage-

ment considerations include the changing character of the road, its setting, and historical context as it winds from the midwest to the southwest; concerns about what to preserve and how to protect this linear resource; how to interpret road remnants; managing multiple jurisdictions, especially private land; and the trend to reduce government regulations and federal spending. The draft report, with five alternatives, will be presented to Congress in the summer of 1995. It is not clear what will happen after that. Additional national Route 66 forums exist. One is the glossy full color *Route 66* magazine, which began publishing in 1994 and has a circulation of twenty thousand. Other organizations come and go. They include the Route 66 Association, the National Historic Route 66 Federation, and the Route 66 World Association. Perhaps the various organizations can come together, much like the old US 66 Highway Association, to work in unity toward Route 66 preservation.

The End...and the Beginning

Unfortunately, preservation efforts for Route 66 are happening in a very fragmented way. It is inevitable that we will lose much of what we love about Route 66, especially the people who experienced the history of the road. As was true throughout its history, Route 66 will continue to change. New places will appear on the roadside. Old ones will fade away. But as long as there is interest and energy, there is hope that Route 66 can be a vital historical landmark. Experience it while you still can. It may not be there tomorrow.



Beyond the Street to the Strip

Hidden History, Revealed Landmarks

Alan Hess
Architect and Architecture Critic
for the San Jose **Mercury News**
San Jose, California

An old hamburger stand symbolizing the gluttonous appetite of the automobile, the American consumer, and corporate buccaneers. The sterile stylings of a dead and discredited architect. A carnival city representing the worst in American values, sprawl and crime.

These hardly sound like promising candidates for historic preservation. Add to these flaws ephemeral materials, outdated uses and academic controversy, and these three examples look even less likely to be included on anyone's landmark list. But the oldest existing McDonald's (1953), Edward Durell Stone's Stuart Pharmaceutical Factory (1958), and the Las Vegas Strip (1941 - present) are cutting-edge examples of the future of preservation. Each is a paradigm of the paradoxes historic preservation must face and resolve - soon.

Of the three, Stuart Pharmaceutical in Pasadena is the nearest to a traditional historic landmark. It is an early and pivotal work by an architect renowned in his time. It is also less than fifty years old, and is currently threatened by the efforts of the building's owner, Johnson and Johnson, to sell the property. Yet Stone, who died in 1978, is rarely discussed today, let alone recognized as an important architect. He was controversial in his time and proudly so, diluting (so his critics would say) the pristine clarity of International Style modernism with historic references and gaudy ornament. Buildings like the District of Columbia's Kennedy Center and Chicago's Standard Oil Building seem thin, pompous and showy. Since his death architecture has travelled in different directions, and there has been no major retrospective of his work, no major book on his career, no effort to bring his buildings into the mainstream of architectural discussion except in the most dismissive manner.

Yet he was a major influence on design of the 1950s and 1960s, founding with Minoru Yamasaki and Phillip Johnson the Neo-Classic stylings that helped break Bauhaus Modernism's clammy grasp on American architecture. Plum commissions fell to him, such as the 1954 United States Embassy in New Delhi, the 1958 US Pavilion at the Brussels World's Fair, and what would become the Kennedy Center for the Performing Arts in Washington, DC. He eclipsed even his friend Frank Lloyd Wright as one of the best known of American architects and appeared on the cover of *Time* magazine in 1958.

Stuart Pharmaceutical was an early example also of a noted architect designing a suburban factory. Stone placed it on a commercial strip and related its landscaping, its employee recreational facilities, its lines and materials to the burgeoning car-oriented suburban culture of the period. His trademark screen walls, white on white forms, and pencil-slim golden columns form an aesthetic foreign to the 1990s, but we must look beyond current taste if we are to identify and begin preserving the landmarks of the future. An award-winning building at a formative point in Stone's evolution should be landmark fodder.

That is what Pasadena Heritage believed in nominating it - successfully - to the National Register of Historic Places in 1994. The ground has been broken for Edward Durell Stone. But the real challenge is how preservation organizations, academics, and communities across the

country will respond not only to Stone buildings, but to the entire range of 1950s, 1960s and even 1970s styles which, like Stone's Neo-Classicism, are not popular, respected or even recognized today. Lever House and the Seagrams building weren't the only architecture of the 1950s. There was the Corporate Modern style seen in Pereira and Luckman's Union Oil Building in Los Angeles. There was the Late Moderne of Paul Williams' Los Angeles County Courthouse. There was the Neo-Formalism of Lincoln Center. There was Disneyland. There are all the city halls, community colleges, upscale restaurants, car dealerships and other buildings that spread these styles and made them part of our general landscape. We have a lot of catch-up work just to document and understand these styles. Only then can we systematically evaluate which examples are significant and worth preserving. Stuart Pharmaceutical is only the tip of the iceberg.

But a major commercial building by a name brand architect, no matter how tarnished the reputation, is an easy call compared to a small roadside food stand by an unheralded commercial architect. Add to that the fact that the building design was a prototype, repeated in over a thousand examples nationwide, and it is even more difficult to establish landmark importance.

Clearly, though, the oldest remaining McDonald's represents fundamental shifts in American lifestyles and the massive influence those lifestyles forced on the shape, form, and look of the American city. We are talking about the automobile city, born in the teens and twenties, but truly reshaping the city in the post-World War II economic boom. Perhaps only the far-flung freeway system itself equals the significance of this one McDonald's in representing these changes.

The oldest McDonald's challenges architectural historians and preservationists to update their ways of looking at buildings. Railroad stations, of course, have long been honored as important civic and cultural buildings. They helped to establish downtown centers. They were designed as public monuments, usually in the prevailing Beaux Arts style of the early twentieth century. By nature they were sizable buildings in major cities, the symbol of centralization of tracks, transportation, urban growth, and corporate wealth.

But in the latter half of the twentieth century, decentralization was the key to urban design, thanks to the car. The transportation monuments of that period necessarily reflect that fact. Instead of one massive building in the center of town, dozens of smaller buildings - like this McDonald's stand - performed the same function of servicing the main mode of transportation, providing for the comfort of drivers and passengers, as well as giving form to the new city. A single McDonald's is not as impressive a structure as Grand Central Station, but the network, the web it spread over the landscape, is in many ways even more impressive.

It teaches us that we must look and think about the city - and its formative monuments - in new ways. For example, it suggests that historic districts be seen as networks, not just a few contiguous blocks.

Today cities may be changing drastically in form, but not in function. A city is still a place for people to gather, whether it is in a courthouse square or at the mall. It is a place for entertainment, whether at a Greek amphitheater, a Broadway theater or a cineplex. It is a place to exchange gossip, whether at the Main Street cafe or the Hardee's on the commercial strip. City hall, the workplace, schools, shops - all are traditional urban functions taking on untraditional forms in the cybercity. When we look for those new forms, we are on the track to discovering the landmarks that will have meaning for the future.

Clearly, the oldest McDonald's, in Downey, California, is a major landmark. It was determined eligible for the National Register of Historic Places in 1984. Yet it continues to be a major preservation struggle. It was closed in January 1994. McDonald's Corporation, which owned the franchise, claimed it was a victim of the January 17 earthquake, but would not allow city officials inside to confirm this. The fact is that McDonald's was looking for a way to shut it down.

That fact is contrary to common sense. Many laypeople can see the incredible value built into this perfectly preserved image from 1953. It is a symbol of our youth, of good times, of the 1950s, which is fast becoming as popular a decade in the public consciousness, in terms of architecture, music, clothing styles and decorative arts, as the Gay '90s or the Roaring '20s. McDonald's Corporation owns a national icon the equal of Elvis Presley, Marilyn Monroe, and the 1959

Cadillac tailfin. There is no logical commercial reason to throw it away.

And in fact McDonald's Corporation is well aware of its value. In 1994 they introduced a new prototype stand with drive-up and walk up service. It's called the McDonald's Classic, and, with its dual arches, canted windows and red and white tile trim, it is an homage to the Downey stand. It is however, a clumsy imitation compared to the svelte original they are trying to demolish.

The illogical reason that McDonald's is turning its back on the Downey stand is this: the two men who owned the franchise from its opening in 1953 until they sold it to McDonald's Corporation in 1992 never paid franchise fees for local advertising and other elements. Their contract with the McDonald brothers, signed before Ray Kroc had even heard of McDonald's, waived those fees. But the hierarchy of McDonald's Corporation as it evolved later always harbored a resentment of the Downey stand. So they do not want it to remain as a landmark.

This curious vendetta may rob the United States of one of its most significant buildings of the second half of the twentieth century. The battle to save it goes on; the Los Angeles Conservancy and the City of Downey are still fighting for it. In 1994 it was named to the National Trust's list of the eleven most-endangered buildings in the nation. More and more, like the citizens of Downey, preservationists will face international corporations with headquarters and interests far from local concerns.

But if it is becoming obvious to many that this individual building is worth saving, it raises wide-ranging implications that need to be addressed. If this building is valuable, what about other buildings of its ilk? Which drive-in movies, which motels should be saved as well? Many of these roadside buildings were purposely ephemeral, built to exploit a fad, an economic opportunity, or a site. What happens when the conditions that caused it change? Their flashy colors and gaudy shapes were the product of roadside laissez-faire, the opportunistic commercial vernacular design processes that exploited fringe districts where codes were lax, outside the influence or regard of serious urban planning oversight. Would planners have had the right to stop such marginal buildings in the first place? When that same laissez faire process dictates the demolition of such buildings, do preservationists have the right to step in and stop it? It seems ironic to do so. Yet do such buildings play a role in the mix of styles, building types and uses that make up a vibrant urban district? Yes.

All of these issues coalesce in the largest and most complex challenge to the preservation of roadside monuments, the Las Vegas Strip. It offers the clearest exposition of the problems and the opportunities in grappling with these preservation issues. The commercial strip is the dominant urban form of the last fifty years. Las Vegas is the ultimate commercial strip, where abundant money and a single-minded recreational purpose allowed its vernacular planning, signage, and aesthetic forces to blossom to a remarkable extent. Here can be seen both the squalid destruction and the transcendent genius of commercial vernacular architecture.

The Las Vegas Strip demonstrates the larger significance of the roadside as an urban form. It displays the evolution of the building as a sign, reported by Robert Venturi, Denise Scott Brown, and Steven Izenour in *Learning from Las Vegas* (1972). From malls to Wal-Marts to office parks, it is an architectural device widely used today. A history of Las Vegas gives us an opportunity to see where it comes from and why it evolved. The concept of a building as a sign (or a sign as a building) did not always exist.

In the 1930s, Fremont Street, the traditional Main Street of Las Vegas, did not look significantly different from the Main Streets of any Midwestern or Western town. Vertical vane signs, perpendicular to the building facade and sketched in neon, were the norm.

Over the next ten years, though, we see something happening to the Las Vegas signs: there are more of them. The competition between casinos and clubs is expressed in larger and larger signs - though still of the traditional vane form. The final version of this line of sign development is seen in the seventy-foot Las Vegas Club sign (circa 1948).

But we also see innovations that expand the concept of the sign. Vegas Vic, a sixty-foot neon cowboy, was built in 1953 by the Young Electric Sign Company. His lineage can be traced directly to the roadside tradition of giant oranges, giant hotdogs, giant hats - mundane objects made special and effective through a surreal increase in scale, but owing precious little to Magritte, Dali, or even Oldenburg. Las

Vegas is developing here its own easy sense of scale fitting to the car-oriented city.

Another sign innovation emerged in 1957 with the Mint casino on Fremont Street. For the first time, signage - the neon, its steel frame structure and its image -took over the entire front of a building. It was the first true sign-as-building in Las Vegas. But it was followed the next year by an even more spectacular example, designed by the same sign artist from Young Electric Sign Company, Kermit Wayne: the 216-foot long Stardust sign, which constituted for all intents and purposes the architecture of the building. The casino was housed in a concrete tilt-up structure, much like a warehouse. But the facade that gave the building presence, visibility and meaning was all sign. It was even bigger than the Mint, to match the scale of the commercial strip. This strategy proved so effective that it was repeated on the Golden Nugget on Fremont Street, where the entire facade was covered in sweeping, flashing neon. Out of such confections came the iconic images of Las Vegas and important urban design strategies seen in cities across the nation.

The innovation did not stop. The next step occurred on the Strip in the 1960s. In the space of three short years were built the Great Signs for which Las Vegas became known worldwide. The Stardust, the Dunes, the Frontier, the Aladdin, Caesars, the Flamingo - these immense signs, reaching 150, 180, 220 feet into the sky, dominated the Strip's lowrise skyline. Their color, fantasy, and animation made them memorable and popular. They defined the classic period of the Las Vegas Strip, as documented in *Learning from Las Vegas*. Most have disappeared, and yet they remain emblazoned in the minds' eyes of millions of people as the image of Las Vegas.

The signs also attracted the attention of the high art community to this new urban form. Tom Wolfe wrote about the signs and their designers in 1964. The Stardust was featured on the cover of *Art in America* in 1972. Like the Monadnock, Reliance and Wainwright buildings seventy years before, the Stardust, Aladdin, and Dunes epitomized the architecture of the commercial city of their era.

The cultural and architectural significance of these signs, and of the Strip that produced them, is indisputable. Should they be preserved? Yes, for two reasons.

One, they have urban value. They define space, they create memorable images, they focus urban activity. They do all the things that courthouse domes, church spires and tree-lined boulevards did in a nineteenth-century city. Even though in today's highrise Las Vegas they no longer dominate the desert skyline as they once did, they are still important.

Two, the signs are invaluable three-dimensional documentation of a new type of city. Their value is not simply nostalgia. The Las Vegas Strip is an exaggerated example of the kind of city we see more and more at the fringes of traditional cities. Built on the skeleton of the old linear lowrise car-oriented suburbs, they are urbanizing suburbs, with highrises, high-density population, varied uses. Whether they are called edge cities, or urban villages, they are now the cutting edge of urban America. They have only recently been defined. We don't really know, generally, what they are. We need to know where they came from and how they developed. Las Vegas is an indispensable case study. And its historic architecture provides the raw data for that study.

This knowledge is crucial if we are to understand and positively direct this new urban form. Yet most of what we know about Las Vegas, for the best known example, is wrong.

How many people believe that the first Strip hotel was the Flamingo? Wrong - there were two thriving luxury hotels on the Strip before it was opened in 1946. The pattern had already been set. How many people believe that Las Vegas was conceived by mobster Bugsy Siegel? Wrong - it is an example of commercial vernacular design raised to the urban scale, the result of hundreds of decisions by dozens of individual hotel operators, entrepreneurs, commercial architects, and sign artists. Reyner Banham called it a collective work of art. How many people believe that Las Vegas mirrored the resort architecture of Miami? Wrong - the architects, architectural forms, styles and car-oriented designs came from Los Angeles, which itself had perfected the car-oriented city.

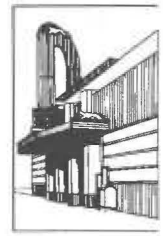
These are examples of how myth has overtaken fact. And the facts are critical knowledge today in understanding the direction of the American city. The buildings and signs of Las Vegas are invaluable data. Yet many of the most important are already gone: the 1947 Flamingo hotel room wing was demolished in 1993, the same year that the Dunes sign and tower went down in a

blaze of infamy. The grand Golden Nugget and Mint signs have disappeared from Fremont Street. And the 1969 Landmark Hotel is the next scheduled to go, to be replaced by a Convention Bureau parking lot. It also played a role in the evolution of the sign into building, echoing the shapeliness and height of the contemporary great signs. Talk of a Las Vegas sign museum continues, but so does the pressure to build larger and tear down the old.

So from the work of well-known but questionable architects (like Edward Durell Stone) to vernacular hamburger stands and roadside ephemera (like the Downey McDonald's) to entire urban districts built according to rules of planning and design developed outside the establishment academies (like the Las Vegas Strip), we have a lot to look out for in the future.

The examples are not obvious. We must look for them carefully, even if they are beneath our noses, so much a part of the fabric of life that they are not noticed as significant. We must train ourselves to see beyond the boundaries of current taste. And then we must do the basic legwork of historic preservation: who designed them? When? Why? What did they look like originally? What other examples are they related to? Very little of this has been done for such vernacular monuments. But it is absolutely necessary if we are to make cogent arguments to planning commissions, historical societies, and the public.

It will be worth it. There is a hidden history to our landscape that has barely been told. Let me end with one thread with a tremendous impact. A Los Angeles architect named Wayne McAllister designed a marvelous series of streamline modern drive-in restaurants in the 1930s. Though not the first, they were undoubtedly the most sophisticated, powerful and successful, outclassing anything on the East Coast and even the car-oriented designs of Frank Lloyd Wright, Mies van der Rohe or Richard Neutra. Working with him in the 1930s was Stanley Meston, who in 1952 designed the next generation of roadside architecture, the original McDonald's. Between the two, the commercial drive-in vernacular becomes something more than fluke designs of untrained designers. The drive-in becomes an architectural tradition, an ongoing style, a canon that is as much a part of American culture as the Gothic campus, the Federal-style house, or the Beaux Arts civic center. Add to this the fact that Wayne McAllister also designed El Rancho Vegas, the prototype luxury hotel and casino on the Las Vegas Strip, the one that set the pattern for a new type of city. From this information, and more to be discovered, arises the demand for nothing less than a revision of our architectural histories to account for these popular and commercial architectural expressions. There is a hidden history that deserves and demands exploration.



Historic Neon Signs? You've Got to be Kidding!

Peter Phillips
Planning Director, City of Bonham, Texas
President, Society for Commercial Archeology
Bonham, Texas

Look at any downtown Main Street photograph from the 1930s or 1940s. The photo is most likely teeming with activity and commerce. Porcelain-enamel and neon signs are displayed almost everywhere. Painted wall signs decorate each large expanse of building wall. Rooftop signs flash out the service or function of each building from a distance. The signs give life, vibrancy, and character to the area.

Fast-forward to a suburban strip on any U.S. highway circa 1958. Notice how few of the numerous signs, buildings, trademarks, and similar icons of suburban commerce are still around when compared to the strip of today. For example, the oldest and one of the last remaining McDonald's hamburger stands with integral arches is closed and seriously endangered in Downey, California. The last of the incandescent starburst Holiday Inn signs disappeared a decade ago under corporate edict (Figure 1). The porcelain-paneled, green and white, Walter Dorwin Teague-designed Texaco stations with their red stars have been gone from the scene for almost twenty years. Thirty years ago, these were three of the most ubiquitous, well known, and easily recognized commercial symbols in North America.

Figure 1. Original style Holiday Inn sign, used from 1952 to 1985. (Photo credit: Peter Phillips)

Where obsolescence, tenant turnover, or corporate orders have not eliminated historic signs and symbols, local or federal regulations have often forced them down. Since the 1960s, many jurisdictions have enacted sign control regulations in the name of urban and rural beautification, blight prevention, and even historic preservation.

It is time, in 1995, to look at surviving signs from that era in a different light. They have somehow survived the environmental movement that began in the late 1960s as a reaction to overconsumption, urban congestion, pollution, and roadside visual clutter. These signs have survived National Environmental Policy Act (NEPA) regulations, state and local versions of NEPA, and Lady Bird Johnson's highway beautification campaign. They have survived changes in popular taste, budget cuts, mergers, corporate down-sizing, the energy crisis, lack of maintenance during lean economic years,

vandalism, and the mansard roof and earth-tone colors of the 1970s. They are scarce artifacts that tell and show us what our values, aspirations, popular colors, feelings, hopes, identities, aesthetic ideals, national mindset, and economies were like at that time. Look around in most cities, and try to find a few of these survivors. Like dinosaurs or fish out of water, they are out of their element, and worthy of much attention if they can be found at all.

Yet even today, surviving historic signs are still being legislated out of existence in many jurisdictions that are behind the learning curve. As recently as September, 1994, *American City and County* magazine carried a glowing article on Virginia Beach, Virginia. With the headline "Revitalization Project Puts City on the Sunny Side of the Street,"[1] the article shows before and after photos of a major commercial thoroughfare with virtually all signs removed from the area in the "after" shot.

In most cities, the environmental beautification movement began in the 1970s. Typical of many cities in the late 1970s, Beverly, Massachusetts, passed a new sign control ordinance that outlawed all flashing or neon signs in its downtown. The City Council, with much prodding from the Planning Commission, enacted stringent size, content, and placement restrictions on any new or remaining signs, allowing an amortization period of a few years for the old ones to be depreciated out. All of this was in the name of downtown revitalization. Subsequently, a few good signs were lost. At the conclusion of the amortization period, a downtown bank officer proudly announced to the City Planning Department that the bank's forty-year-old time and temperature landmark sign was in violation of the ordinance and that the bank was removing it that week. The bank, not wanting to risk even a hint of government challenge or public controversy, had suddenly decided on its own that the old sign, known and loved by everyone on Main Street, had to come down. And before the Planning Department could try to explain that the sign was really a part of the architecture of the facade and, therefore, not really in violation, the sign was gone.

Well-meaning but misguided local design review commissions and planning boards have often insisted on the elimination of all old signs in historic districts and downtowns as the buildings are restored, often with the exception of non-offending carved wooden signs. This tends to make the restored structures look antiseptic and barren of activity (Figure 2). In some cases, they may be affixed with signs that are out of character with the buildings. For example, an Art Deco storefront or hotel from the 1930s would never have had a small, hanging, carved, wooden sign. It surely would have had a porcelain-enamel sign, most likely supplemented with neon lettering if the business was more than a marginal one (Figure 3).

In the 1990s, some preservationists and city planners are realizing that the old signs are not replaceable; that their quality, rarity, unusual appearance, animated graphics, or other distinctions are just as worthy of preservation as the unique buildings to which they are attached. Some sign owners and merchants are finding new allies as they fight what they see as oppres-

Figure 2: A restored, circa 1920 auto dealership building, devoid of all signs and looking very barren, thanks to overzealous sign control ordinances in Fort Worth, Texas. (Photo credit: Peter Phillips)

sive regulations, limits on creativity and self-expression, and enforced destruction of what is scarce and worth saving.

From the preservationist's point of view, the whole issue is succinctly summed up by Michael Auer in *Preservation Brief 25*: "Sign controls can impose a uniformity that falsifies history."[2] By requiring a standard size, standard materials, and a standard method of illumination, strict sign ordinances force all owners, all uses, and all structures to deny their origins, and their diversity of age and purpose, in order to conform to a preconceived notion of what is appropriate for the downtown historic district and hundreds of other historic districts.

Today, a small but increasing number of cities around the nation are encouraging or at least allowing for the continued existence and preservation of old commercial signs. They do this through the adoption or amendment of sign control ordinances, taking into account the nonconforming size, lighting, or placement of an old sign that is deemed historic. The ordinance typically allows for an exemption or special designation for all such signs in a particular district, or for individually designated signs, usually over a certain age, that meet certain criteria.

These criteria can be:

(a) *A rarity or distinction in the sign's materials or craftsmanship.* This includes three-dimensional stainless steel lettering, and virtually any porcelain-enamel or neon signs due to their age, scarcity, and extensive cost of replication (Figure 4).

(b) *A large, well known sign that has become a popular landmark in the community by reason of its prominent location, long existence, large size, and/or unusual design.* Landmark signs are well known regionally, such as the Citgo sign in Boston's Kenmore Square or the Central Trust sign atop a bank in Cincinnati.

(c) *A sign that is integral to the design of a building and helps to identify the era or style of the building.* For example, Carrara glass panel signs (Figure 5), or Art Moderne pylons.

(d) *Signs that advertise an obsolete product or defunct business, and which may give the only clue as to a building's original use.* Such signs are rarely architecturally significant, but are always historically significant. These often become ghost signs, which appear after a rainstorm or when an adjacent building is torn down (Figure 6).[3]

Figure 3. Monarch Dry Cleaners, Houston, Texas, with its original porcelain-enamel and neon signs. (Photo credit: Peter Phillips)

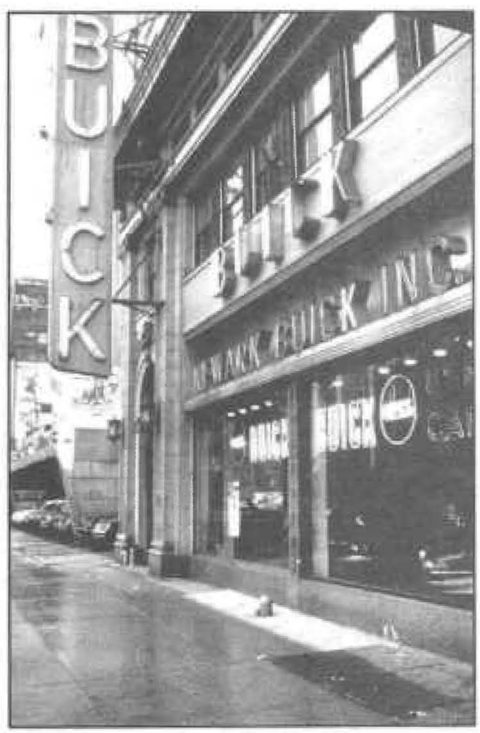


Figure 4. Newark Buick Co., Newark, New Jersey, with three-dimensional stainless steel lettering and neon signs. (Photo credit: William McLaughlin)

The following is a beginning, yet an incomplete list of jurisdictions that have some type of regulatory provision for historic or unusual signs: Aurora, Colorado; Aurora, Illinois; Baltimore, Maryland; Boston, Massachusetts; Cobb County, Georgia; Culver City, California; Dallas, Texas; Deadwood, South Dakota; Manhattan, Kansas; Marietta, Georgia; New York, New York; Pasadena, California; Portland, Oregon; Rapid City, South Dakota; Rockford, Illinois; Sarasota, Florida; Seattle, Washington; and Topeka, Kansas. At last report, Raleigh, North Carolina, and Miami, Florida, were debating whether or not to adopt similar provisions.

So, how do these ordinances work? Some communities, which already have historical commissions, ask that board to review the sign's application for historic designation before it is forwarded to the city council for official action. Others have their ordinance structured so that the planning board reviews and makes recommendations on historic signs before going to the city council for the final determination. Still others denote certain blocks or districts where all signs are encouraged and allowed, to preserve a certain ambiance or character of activity in a commercial neighborhood. For example, Baltimore, Maryland has an area known as "The Block" that has been its burlesque district for decades. In order to continue the strings of bare, gaudy incandescent light bulbs that adorn most of the buildings, the burlesque district is allowed an exemption from the City's sign control ordinance. In New York City, buildings fronting Times Square are actually required to have signs that maintain certain minimum levels of illumination and size in order to preserve the glitter and ambiance historically associated with that part of the city.

A variation of this is the "special sign district" found in Dallas, Texas, and Seattle, Washington. In Dallas, a zoning ordinance amendment, similar to an overlay zoning district, is adopted by the city council, delineating the area of the district and the special regulations pertaining thereto. This particular sign district is in the City's early twentieth century West End warehouse district, where the restrictions ensure that signs do not visually obscure significant architectural features of the brick warehouses and are of "appropriate historical design." In Seattle, the Pioneer Square Historic District receives similar zoning consideration for its signs.

More and more often, historic signs are so scarce and spotty in their survival that designation and zoning protection are on an individual sign-by-sign basis, instead of by districts. Therefore, the majority of cities that do provide for historic signs have mechanisms for assessing the significance of each and for exempting a sign from the restrictions of the overall city-wide sign control ordinance, thereby saving the sign from having to be removed.

In Culver City, California, for example, the city council can designate a sign "historically significant" upon application by the owner and a recommendation from the planning commission. The sign must be found to meet several criteria, including structural safety, continuous existence at the same location for at least fifty years, and enhancement of the community's cultural, historic, or aesthetic quality.

In Dallas, individual designation and protection are given to "landmark" signs. As in Culver City, the planning commission receives and reviews the application for landmark sign status, and makes its recommendation to the city council, which has the final authority. To receive landmark designation in Dallas, a sign must:

(a) Be at least fifteen years old;

(b) Be visible from a distance of one-half mile or more from a major thoroughfare or expressway;

(c) Possess unique physical design characteristics such as configuration, color, texture, or other unique characteristics; and

(d) Be of extraordinary significance to the city.[4]

Unfortunately, zoning protection alone does not guarantee the survival of a distinctive old sign. Corporations that force their franchisees to remodel or adopt a new, updated logo every few years are among the worst offenders against historic signs. For example, Simpson Buick in Downey, California, recently replaced its marvelous, circa 1960 rocket-inspired sign which matched the dealership's architecture perfectly (Figure 7). Today, a typical blue and white General Motors backlit plastic rectangle sits in its place. A change in business occupancy or ownership is another disincentive, about which little can be done. The often prohibitive cost of upkeep, mainly for old neon signs, is another problem.

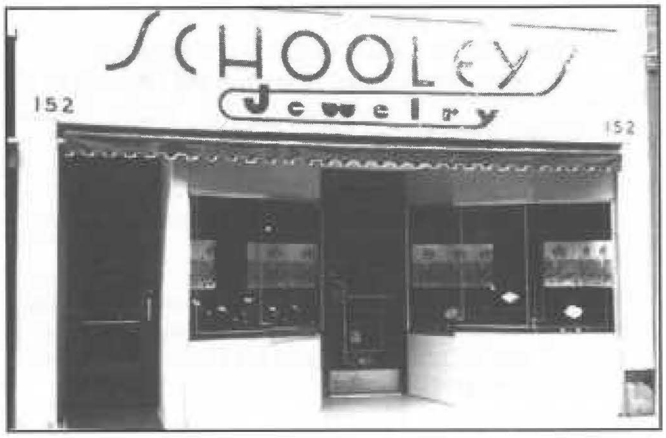


Figure 5. Carrara glass panel sign, Schooley's Jewelry, Ithaca, New York. (Photo credit: Peter Phillips)

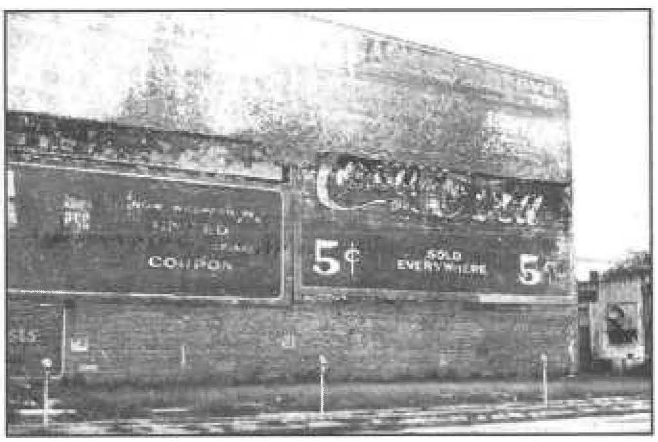


Figure 6. Ghost signs in downtown Galveston, Texas. (Photo credit: Peter Phillips)

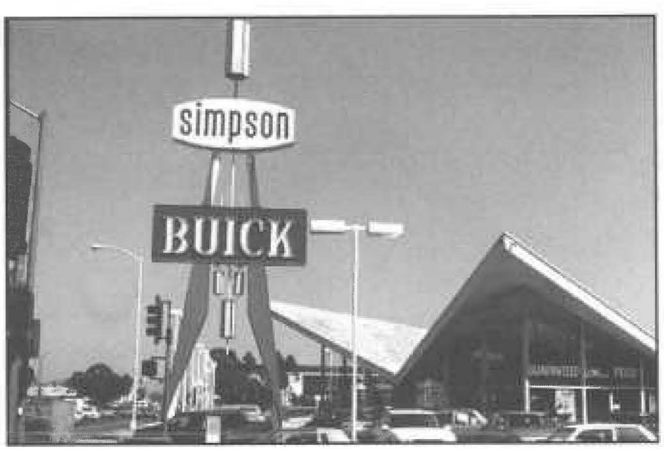


Figure 7. Circa 1960 rocket-inspired sign and dealership building, Simpson Buick, Downey, California (1989 photo; sign demolished 1991). (Photo credit: Peter Phillips)

Financing and grant assistance programs for the restoration of historic signs should be considered by historic agencies and governmental jurisdictions. However, removing the zoning and legal barriers, as has been described here is the first step toward sign preservation.

Notes

[1] "Revitalization Project Puts City on the Sunny Side of the Street", *American City and County* 109 (no. 10), September 1994): 32.

[2] Michael J. Auer, *Preservation Brief 25: The Preservation of Historic Signs* (Washington, DC: Department of Interior, National Park Service, 1991), 6.

[3] City ordinances are not copyrighted, but are in the public domain.

[4] *Ibid*

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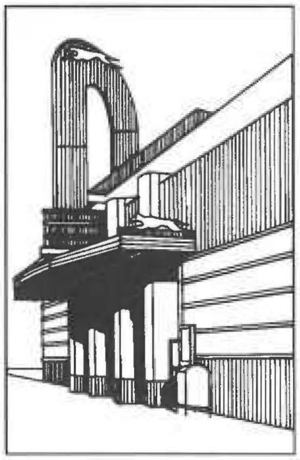
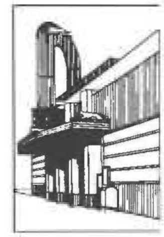


Preserving Military Assets

Preserving the Past While Building for the Future: The ARMS Initiative and Defense Conversion, *Rand Fishbein*



Preserving the Past While Building for the Future: The ARMS Initiative and Defense Conversion

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Preserving America's military past has never been easy. The changing requirements of national security, coupled with funding shortfalls, have led to the destruction or neglect of structures and equipment that were, at one time, the backbone of our nation's defense. Not surprisingly, much of this important legacy exists on military bases, within Department of Defense industrial plants and on test and training sites around the country.

Locked behind gates for fifty years, these important relics of American power, strategy, and diplomacy exist beyond the reach of the public and the future generations of Americans they might instruct. Icons of World War II, Korea, and Vietnam, they stand as silent witnesses to the Cold War struggle and some of the most important events to shape our century.

What to do with the physical remains of this era, and how best to provide for their restoration and maintenance, pose continuing challenges for the preservation community. These are problems complicated by the rapid downsizing of today's military establishment and by the many competing political and economic interests that exist both on and off of our defense installations.

The Base Realignment and Closure (BRAC) process has only added a new urgency to the task of conservation, as scores of important properties, and the history they contain, are being transferred from government control and in many instances dismantled and discarded. Without proper planning, many of these sites may well be swallowed up by housing developments, airports, and commercial centers, with little or no reminder of their historical significance.

One answer to the preservationist's dilemma can be found in the creation of an Army program that addresses many of the concerns which accompany defense conversion.

The program is the Armament Retooling and Manufacturing Support (ARMS) Initiative. It was established by Congress as part of the FY 1993 National Defense Authorization Act (P.L. 102-484), to pioneer the cooperative use of government facilities and to serve as an alternative approach to the use of public funds to finance their overhead costs. A two hundred million dollar one-time appropriation was made available in the FY 1993 Defense Appropriations ACT (P.L. 102-396) to provide a pool of start-up incentive funds for the program.

The focus of ARMS is the nearly twenty active and inactive Army ammunition plants around the country. They are the remnants of a once vast industrial complex that, at the time of World War II, contained over a hundred production facilities. With the development of smart weapons, better means of production, a decline in operating support, and lately, a reduced threat environment, most of these plants have disappeared.

What the ARMS program makes possible is the preservation of a core competency in our government-owned, contractor-operated (GOCO) ammunition production base without the need for large congressional appropriations to cover overhead costs. It is the reduction in government funding which has led, in part, to the serious deterioration in infrastructure -

including historic structures - on many of the installations.

Simply stated, ARMS makes it possible for Army-owned ammunition facilities now to be opened to private industry for a wide variety of commercial purposes. A facilities use contractor is selected by the Army to operate the installation as a profit-making concern while still remaining accountable for the maintenance of its core defense capability. A strategic plan devised by the contractor and approved by the Army guides the reuse of the facility.

In just two years, ARMS has transformed the way in which the Army does business and protects its vital assets. During this period, the program has been singularly responsible for the creation of over one thousand skilled jobs at GOCO ammunition plants and a return on investment of well over thirty percent.

This astounding achievement was made possible by instituting fundamental changes in the way the Army manages, supports, and promotes its ammunition production facilities. Instead of relying exclusively on annual appropriations to ensure the continued upkeep of its facilities, the Army is now mining the value of its facilities and is looking to the private sector to market these facilities to the world. From this commercial activity, the Army expects to generate sufficient revenue to ensure that the maintenance needs of its ammunition plants are fully met.

This approach is important to the conservation community because it opens up the possibility that revenue generated by the facility could be used to support the preservation of historically significant structures and artifacts on-site as well as environmental remediation. It also makes possible the creation of innovative public-private partnerships for the reuse of these structures and their incorporation into broader community development, educational, and tourist strategies.

Unlike so many other attempts at defense conversion, the ARMS program works. In December, 1994, the Indiana Army Ammunition Plant (INAAP) became the first installation of its kind to zero out the Government's cost to maintain a plant. This could well be a precedent: the first time in recent history that a government facility will be maintained at no cost to the taxpayer. As Major General Dennis L. Benchoff, Commander of AMCCOM has stated: This is a monumental achievement which sets the course for future success in defense conversion."

The Mississippi Army Ammunition Plant (MSAAP) is expected to follow the lead set by Indiana and within months become the second plant to become self-supporting. In time, the Army's ARMS coordination team expects to have all of its inactive ammunition plants operating as commercial entities, free of appropriated funds and fully capable for remobilization if required.

Under the ARMS plan, the government will continue to retain title to those active and inactive ammunition facilities which it determines are necessary for war mobilization and stockpile replenishment. However, responsibility for the day-to-day operation of the installation will fall to the facilities use contractor.

Practically, this means that the facility contractor's income is now dependent upon the revenue which can be generated from the third party tenants at the plant. If the contractor is unable to meet his obligation to attract new manufacturing or service industries to the plant, then the Army will seek new management.

This new business approach to running government industrial plants requires that the contractor be alive to new commercial opportunities, both in the defense and non-defense sectors, and that all corporate decisions be based on the economics of the marketplace. It also demands that they be sensitive to the community and the value of the historical artifacts on-site.

Under ARMS, both the facilities-use contractor and the Army remain subject to all environmental and historic preservation statutes.

Experience has demonstrated that the ARMS program represents a workable, common sense alternative to the Base Realignment and Closure (BRAC) process. Instead of merely closing and disposing of valuable installation assets the Government can use its holdings to leverage economic growth and maximize income producing potential. Liquidating the asset merely exposes the taxpayer to large up-front environmental clean-up costs for which funds are already woefully inadequate. The "third way" pioneered by ARMS can facilitate environmental remediation and historic preservation efforts

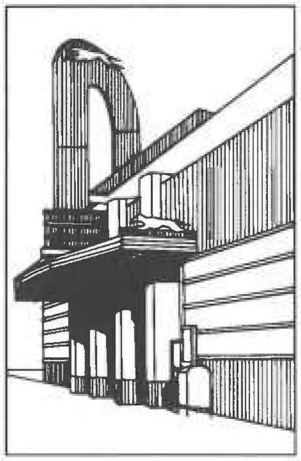
while ensuring that military assets can be reconstituted by the Government in the event of a national emergency.

When properly implemented, ARMS represents a rational, cost-effective and "user friendly" response to military downsizing. It also represents an important new tool for preservationists who seek to protect historic military assets from neglect or destruction. The advantages of the ARMS process to the preservation community include:

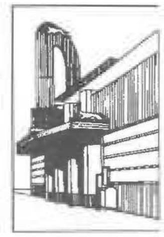
- for the first time, ARMS opens up military installations to the local communities, making their activities more visible and more accountable to public scrutiny;
- each installation under ARMS must create a strategic plan that should inventory the historic assets on the installation, and how they are to be preserved and integrated into the reuse plan;
- facilities use contractors are encouraged to market the history of their installation along with its industrial capabilities as a reflection of the quality of life that companies might expect when relocating their businesses to an Army site;
- the ARMS public private task force provides a forum where all stakeholders in the future of the installation have an opportunity to influence the course of installation conversion;
- funds are provided under ARMS to assist both facilities use and third party commercial contractors with the development of baseline studies on the assets they propose to use and the impact of their commercial activity on the asset and its environment;
- revenue is generated through the ARMS commercial reuse effort which can be applied in part to preservation enhancement activities on the facility;
- using the ARMS cooperative use model, community conservation groups are able to work with the facilities use contractor to develop installation assets into revenue generating tourist attractions; and
- ARMS provides a structured management approach to military downsizing which includes the development and the protection of historic military assets.

Supporters note that this model might easily be applied to other parts of the defense industrial base where there is a critical need to maintain a skilled work force, promote technology reinvestment and ensure military readiness. Already the Army and Air Force depot communities and the Department of Energy are looking at developing similar programs.

ARMS clearly provides many opportunities for the preservation of military artifacts. Still, it is important for communities and conservationists to become engaged in the work of the initiative if we are to ensure that the historic remnants of past generations are preserved for the study and appreciation of the public in the future.



Contemporary Landscape Architecture



Preserving Contemporary Landscape Architecture: Is Nothing Permanent but Change Itself?

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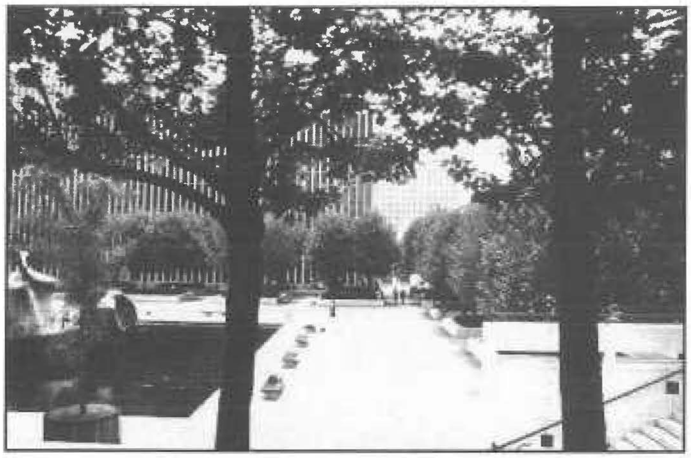
> We live in a world whose advances are based on the continuous expansion of the use of the scientific method, beyond those fields called exact, to such as esthetics and sociology. The scientific method is one which takes nothing for granted, accepts no precedents without examination, and recognizes a dynamic world in which nothing is permanent but change itself.
>
> Garrett Eckbo, *Landscape for Living* (1950)

When we think of the treatment of historic landscapes, we often think about the preservation of the works of Frederick Law Olmsted, Sr., Jens Jensen, or Beatrix Farrand to name three well-known pioneers of the profession. When we consider the contributions of contemporary visionaries such as Lawrence Halprin, Dan Kiley, James Rose, or Hideo Sasaki, we don't often think of these landscapes as historic resources requiring special protection. Think again.

It was not too long ago that the first printing of Norman T. Newton's *Design on the Land* (1971) included a perspective rendering of the "outstanding design" for Copley Square by Sasaki Associates (1966) with the caption, "the famous Copley Square redesigned at last."[1] It's ironic that Newton's book can still be found on bookstore shelves, while the redesigned Copley Square has since seen another design competition (1983) and complete reconstruction (1989).

During a recent conversation between A. E. Bye, FASLA, and Lawrence Halprin, FASLA, Bye recollects "Larry stated that we spend thirty to forty years trying to get our projects built, and then the next ten to twenty years trying to make sure that they don't get knocked down."[2] When discussing this situation with Halprin, his frustrations are immediately evident. He states, "If a painting or sculpture is purchased, it is safe to assume that they will be respected. A house or landscape, however, may be brought down."[3]

At the time of the writing of this article, a substantial number of landscapes from the recent past are currently at risk or have recently been substantially altered. These include residential designs by A.E. Bye (Gainesway Farms, Lexington, Kentucky), James Rose (James Rose House, Ridgewood, New Jersey) and Jane Platt (Jane Platt Garden, Portland, Oregon); streetscapes, squares and plazas by Dan Kiley (Independence Mall, Philadelphia, Pennsylvania; Burr Sculpture Court, Hartford, Connecticut) and Lawrence Halprin (Nicollet Mall, Minneapolis, Minnesota; Embarcadero Fountain, San Francisco, California); nearly all of the shopping center designs by Louise Shellhorn (Bullock Wilshire, Pasadena, California; Sherman Oaks, San Fernando Valley, California); parks by Richard Haag and Jones and Jones (Occidental Park, Seattle, Washington) and Dan Kiley (Jefferson National Expansion Memorial/ Gateway Arch Memorial Landscape, St. Louis, Missouri); campus plans by Dan Kiley (Concordia Junior College, Fort Wayne, Indiana; US Air Force Academy at Colorado Springs, Colorado); zoos by Clarke and Rapuano (Central Park Zoo, New York City) and William C. Pauley (Grant Park Zoo, Atlanta, Georgia); and exposition grounds by Clarke & Rapuano (New York World's Fair, now Flushing Meadows Corona Park) and Richard Haag (1962 Seattle Worlds Fair, now Seattle Center).



In many contempory landscape architectural projects in urban areas, signature plant materials, lighting and furnishings are often altered without consideration to the original design intent. Recently, at Lincoln Center, New York City, New York, historic sycamore trees which were planted in groups of four were replaced with single Bradford Pears. (Historic photo courtesy of the Office of Dan Kiley)

According to Lawrence Halprin, "the ideal situation is when we can remain involved." Fortunately, return requests have been the case for Halprin at Portland's Auditorium Forecourt Fountain and for Kiley at the Art Institute of Chicago - the latter representing a thirty-year association. According to Mary Hughes, ASLA, there is often an issue of "institutional memory." Hughes is the Regional Historical Landscape Architect, National Park Service, Midwest Region who intervened when maintenance-driven alterations were proposed for the landscape of the Gateway Arch, St. Louis, Missouri. She states:

> The degree to which the landscape design was integral to the overall concept of the Memorial evolved over almost twenty years of close collaboration between Saarinen and Kiley. This had dropped out of institutional memory because Kiley's role had not been mentioned in previous historical accounts of the Arch construction. Since Kiley's reputation as a preeminent figure in contemporary landscape architecture is well established by this point in time, the historical significance of the Arch landscape rested on resolving the question of the landscape's integrity, or the ability of the existing landscape to reflect the essential qualities of the original design.[4]

Integrity is defined by the National Register of Historic Places as "the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic period."[5] Therefore, if features that are critical to the overall significance of the design are removed or altered, the integrity of the design will most likely be compromised. To illustrate this point, one can refer to the removal of native bank plantings and their replacement with a mown lawn at Colby College, Waterville, Maine (design by Carol Johnson Associates); the elimination of symmetrical groupings of London Plane trees that form a bosque and their replacement with solitary Bradford Pear trees at Lincoln Center, New York City (Dan Kiley); eliminating well-established foundation plantings to accommodate new above-ground ventilation ducts at Robson Square, Vancouver, British Columbia (Cornelia Oberlander); unresolved replacement challenges posed by the death of two sentinel California Live Oaks at the Dewey Donnell Ranch, Sonoma, California (Thomas Church); or the recent removal of a fountain designed by Lawrence Halprin for the 1962 Seattle World's Fair and its replacement with a new work of contemporary sculpture on the same location.

Probably the greatest loss has occurred with the redesign and/or enclosure of outdoor regional shopping centers and their associated landscaped spaces between buildings - thus eradicating an important chapter in the profession's evolution from the mid-to-late 1950s through the 1960s. Additionally, although not outright demolition, another unfortunate scenario in these areas and many other landscape projects of this era has been the "upgrading" of site-specific character-defining pavements, lights and streetscape furnishings that are now difficult to maintain, or are perceived as out of fashion. In the case of the recently altered Nicollet Mall, Lance Neckar, ASLA, states, "The mall was an experiment - designed using new, untested

materials that were not durable or appropriate to Minnesota. It became costly to maintain over the long term (for example, the maintenance of the lights alone ran $100,000 annually). As a formal idea we regret its passing, yet the local group was adamant that it had to change."[6]

Recognizing a variety of limitations and both physical and natural pressures, what are the possibilities for the documentation, evaluation and preservation of this recent, yet important legacy? Based on an analysis of the current situation, the following ideas could be pursued:

1. *Pursue Nominations to the National Register for Recent Landscape Architecture.* According to *National Register Bulletin 22: Guidelines for Evaluating and Nominating Properties That Have Achieved Significance Within the Last Fifty Years*:

> as a general rule, properties that have achieved significance within the last 50 years are not eligible for National Register listing because the Register is intrinsically a compilation of the Nation's historic resources that are worthy of preservation. The National Register does not include properties solely for their contemporary impact and visibility, and it rarely is possible to evaluate historical impact, role, or relative value immediately after an event occurs or a building is constructed. The passage of time is necessary in order to apply the adjective 'historic' and to ensure adequate perspective.[7]

Photo ca. 1970s of Nicollet Mall, Minneapolis, Minnesota soon after its opening. (Courtesy of Lawrence Halprin)

However, justification for significance has been achieved for a number of modern architectural examples - in fact, there are nearly one thousand buildings on the National Register that fit this category. One such example is the Whitney Museum of American Art in New York City, constructed between 1963 and 1966. The nomination states that the Whitney "is of exceptional significance as the work of an internationally acclaimed master, Marcel Breuer, whose work had a profound influence on the course of American architecture and as a representative of the Expressionist movement in modern American architecture during the 1950s and 1960s."[8] Within this established framework, one could easily consider landscape architectural works of this movement and nominate them with sufficient context.

2. Establish a Greater Context for Contemporary Landscape Architecture. This will be necessary to achieve Idea 1 presented above; however difficult this may be, there is already momentum established. In the past few years, there has been a dramatic increase in scholarly works with a focus on recent landscape architectural history. Examples include Marc Trieb's *Modern Landscape Architecture: A Critical Review* (1993), Dorothee Imbert's *The Modernist Garden in France* (1993) and Felice Frankel and Jory Johnson's *Modern Landscape Architecture: Redefining the Garden* (1991) with many more on the immediate horizon. Other invaluable forms of contextual history are contained in thematic issues of *Process Architecture* - each written by the designer. Dedicated issues have contained the works of Garrett Eckbo, Paul Friedberg, Dan Kiley, SWA, Peter Walker and Robert Zion.

Finally, oral histories should be carried out with significant designers. For example, over the past few years the Hubbard Trust has funded oral histories of Gilmore Clarke, Garret Eckbo, Norman Newton, Arthur A. Shurcliffe, and Charles Eliot II; Pennsylvania State University has videotaped interviews with several John R. Bracken Fellows and Lecturers including A.E. Bye, Ian McHarg, Roberto Burle Marx, Roderick Nash, Sir Geoffrey Jellicoe, and John Simonds; and the University of California Regional Oral History Office, Bancroft Library has undertaken oral history for California figures such as Thomas Church.

Recent photo of the Nicollet Mall, Minneapolis, Minnesota, with new pavement and furnishings. (Photo courtesy of the author)

3. Document Threatened Work. For masterworks in particular, those landscapes should be documented, especially if they are threatened with change. This would have been extremely useful for Nicollet Mall, especially since no "as-built" plans are known to exist.

Another example that is at current risk is Gainesway Farms, Lexington, Kentucky. Considered by many to be one of A.E. Bye's most significant works (executed 1974-1982) it has recently been sold. Upon hearing rumors of redesign to include new fences, and alterations to character-defining topography and plantings, Bye made a site visit to meet with the new owners. According to Bye, they "did not have a meeting of the minds." Like many Bye designs there are no project drawings generated by his office (other than those produced for publications that followed). Should local American Society of Landscape Architects (ASLA) chapters, academic institutions, and State Historic Preservation Offices be involved? During a recent conversation, ASLA Kentucky Chapter President, Patrick Hoagland of Lexington, said, "The local ASLA chapter is doing nothing. We didn't know that Gainesway was sold."

The Historic American Building Survey (HABS) contains no documentation of modern works other than what is contained in associated project photography, but this is about to change. HABS is negotiating with the American Institute of Architects (AIA), which has established a HABS advisory board. According to Paul Dolinsky, HABS Chief, "When a building receives a 25 year award from the AIA, as part of this recognition, the original architects' drawings would be submitted to HABS, and the as-builts would become a part of the HABS collection." If landscape architectural accomplishments were to consider a similar recognition, they, too, could be put on mylar and accessioned into the permanent collection at the Library of Congress.

4. Consult with the Original Designer, When Possible. Carol Johnson, FASLA, points out that a continuum of design can often provide many advantages. She suggests that the original landscape architect could "come at it with an informed approach - complete with an understanding of what people were like then and now, coupled with a knowledge of the history of the landscape in both detail and how it evolved." This information would surely prove useful at Dulles Airport where EDAW, Inc., is consulting on an expansion planning project that includes visual and design evaluations. According to project manager Richard Dorrier, "We are looking at how various options of development would affect the aesthetics." To date, the original landscape architect Dan Kiley has not been brought in.

For Halprin, who has been recently called back at the Auditorium Forecourt Fountain, Portland, Oregon, many questions need to be asked. Here Halprin has recently consulted on issues of maintenance, lighting, and the perimeter trees that have matured to such a degree "that views into this much beloved space are no longer possible." In revisiting his design, Halprin queries "where does history stop and how far back do you go?" He also recognizes that

"sometimes things need to be changed and a new society or series of events warrant new design." This philosophical framework has had an immediate impact on establishing the design intent for this rehabilitation project.

5. Educate Owners and Public Stewards. As a profession, at all levels we should strive to educate public municipalities and private residential owners of the significance of these properties. This is precisely what Dean Cardasis, ASLA, University of Amherst, and others are currently proposing for the James Rose House, as well as for his extant legacy of residential designs. Today Rose's house in Ridgewood, New Jersey, is owned by a not-for-profit organization. The challenge for this group is to arrest the further deterioration of a property that evolved in accordance Rose's own design philosophies between 1953 and 1980, started to decay thereafter, and is presently in a state of great disrepair. The fruits of these labors have already been evidenced through a partnership with the Garden Conservancy, academic support, local sponsorship and assistance from other homeowners of James Rose landscapes, the latter now having a greater interest in their own landscapes.

6. Establish Creative Partnerships. Antonia Adezio, Executive Director of the Garden Conservancy, suggests that "a lot of what we do is association." Formed in 1989, the Conservancy has assisted a number of owners and interested community groups. Part of its mission is to "preserve fine gardens beyond the mortality of their creators and their ephemeral natures, to fortify the gardener's artistic vision so that it may be shared with generations of gardeners yet to come." This includes horticultural management to support and reinforce the original design intent, as well as legal, financial and administrative expertise to meet the challenges of transferring a garden from private to public ownership and ensuring its continuing existence and integrity. The Conservancy also assists in the planning process, developing horticultural management plans, setting an endowment and creating fund-raising strategies to ensure a garden's financial future, and forming or strengthening local support.

The future of Arthiur Edwin Bye's design at Gainesway Farms, Lexington, Kentucky, is uncertain. Locally, there has been no discussion between landscape architectural professionals and the current owners. (Photo courtesy of A. E. Bye)

One such recent example of the Conservancy's efforts has been its involvement with Jane Platt's garden in Portland, Oregon. Platt's garden has been well-known in horticultural circles for many years, but the future of this garden following her death three years ago had been uncertain. Current initiatives have developed a management plan and enlisted the support of the local garden club, whose members have pitched in to assist in the maintenance of what Adezio refers to as a "very personal garden." As a result of this quasi-public partnership, the garden is now being preserved and is open to the public.

7. Ensure Proper Homes for Archives. Finding a home for a landscape architect's archives can be as challenging as convincing a practitioner to donate their collections to an institution. The situation over the past few years has improved considerably, with many institutions ready and willing to accept collections that include contemporary works. The University of Pennsylvania, for example, has recently accepted the collections of Lawrence Halprin, George E. Patton and Philip N. Winslow.

8. Utilize Current Standards and Guidelines When Embarking on Project Work. The National Park Service provides technical assistance for registering, nominating, analyzing and treating historic landscapes. Sympathetic applications of these tools and methodologies should be considered and tailored to these unique resources.

9. Formulate a National Strategy. The ASLA and/or the Landscape Architecture Foundation should develop a strategy to safeguard this legacy through a specialized committee, consisting of recognized landscape historians and scholars. The committee could strive to evaluate and recognize those significant landscapes that are threatened with change or eradication. It could utilize proven criteria that are modeled after programs such as the NPS Landmarks at Risk program. Such an arm of the ASLA to honor these contemporary masterworks that have stood the test of time is essential, if we are truly to maintain an honest and complete record, provide a tool to enlighten ourselves and the general public, and ultimately insure their survival.

As architectural historian Richard Longstreth has recently stated, "If we continue to disregard so much that is all around us, we may waste far more than we preserve and bestow upon future generations the difficult task of deciphering the carcass."[9] We must have a commitment for these landscapes that are often a part of our everyday lives, including those that we take for granted. If we allow these losses and modifications to continue, unmonitored by the profession and allied communities, we run the risk of editing-out a significant chapter in the profession's evolution.

Notes

[1] Norman T. Newton, *Design on the Land: The Development of Landscape Architecture* (Cambridge, Massachusetts: Harvard University Press, Belknap Press, 1971), 652.

[2] This and following Bye statements in this paper are taken from a phone conversation between Bye and the author, April 1994.

[3] This and following Halprin statements in this paper are taken from several conversations between Halprin and the author, March–April 1994.

[4] Conversation between Hughes and the author, October 1993. Hughes has been instrumental in educating managers at Jefferson Memorial Park about the virtues of Kiley's design. When a landscape architect was hired for the park, her job description required an understanding of cultural landscape preservation issues and a knowledge of contemporary landscape architecture design.

[5] National Park Service, *National Register Bulletin 16A: How to Complete the National Register Form* (Washington, DC: US Department of the Interior, National Park Service, Interagency Resources Division, 1991), 4.

[6] Conversation between Neckar and the author, Spring 1994.

[7] See the detailed nomination for the Whitney Museum contained in the National Register Files, Washington, DC. This listing is included on a recent ninety-two page printout of "buildings with less that fifty years of significance" from the National Register.

[8] Conversation between Hoagland and the author, Spring 1994.

[9] Conversation between Dolinsky and the author, Spring 1994.

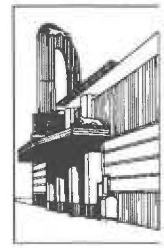
[10] Conversation between Johnson and the author, Spring 1994.

[11] Conversation between Dorrier and the author, Spring 1994.

[12] This and following Adezio statements in this paper are taken from a conversation between Adezio and the author, Spring 1994.

[13] Richard Longstreth, "The Significance of the Recent Past," *APT Bulletin* 23, no. 2 (1991), 23.

The Dulles International Airport Terminal Building, Chantilly, Virginia, by Eero Saarinen and Associates was recognized by the AIA in their Twenty-Five Year Award program in 1988, yet the landscape by the Office of Dan Kiley has not received equal recognition. (Photo courtesy of the Office of Dan Kiley)



Understanding the Design Intent of Dan Kiley's St. Louis Arch Landscape

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> In the trees [around the arch] there was...a symbol of the American wilderness into which explorers had forged. The clearing from which the arch would rise, in single magnificence, was the image of the primitive clearings in which they had camped....[1]

The Gateway Arch is a contemporary icon, recognized internationally as the symbol of the Jefferson National Expansion Memorial and its home city, St. Louis. Far less widely understood is the horizontal dimension of the Memorial concept, which embraces the entire ninety-one-acre site along the banks of the Mississippi River and serves as a counterpoint and complement to the soaring verticality of the 600-foot structure. This paper will explore the process by which the National Park Service (NPS) is evaluating the historical significance of the landscape at the Jefferson National Expansion Memorial, designed by landscape architect Dan Kiley in close collaboration with the Memorial architect Eero Saarinen. Since the research project is currently in progress, this discussion will only suggest a tentative evaluation process and some preliminary conclusions, reserving judgment on the outcome pending project completion, scheduled for 1996. Though incomplete, this case study illustrates a number of issues related to the preservation of historically significant works of contemporary landscape architecture. These include the lack of landscape documentation in institutional records, the assessment of historical significance and integrity of a design that has not yet stood the "test of time," and the role of a living designer in documenting and managing the landscape.

In contrast to the level of documentation available on the design and construction of the Arch structure,[2] the record of Dan Kiley's role in the design of the landscape had dropped out of institutional memory. The National Park Service attitude toward the Memorial grounds bears marked similarity to the omission of the landscape design from published accounts of the development of Cranbrook Academy of Arts, as described by Diana Balmori in her recent article "Cranbrook: The Invisible Landscape."[3] One source of misunderstanding was the noticeable difference between the forested landscape depicted in the 1948 competition drawings and the design as finally constructed (Figures 1 and 2). Because the evolution of the design over seventeen years of Kiley's career was not documented in the park records, park staff assumed that the "original" design was never built. In addition to the "invisibility" of the designer's role in developing the concept for the Memorial grounds, the project history is further complicated by its phased implementation over many years. In fact, the final stage of landscape installation was completed as recently as 1981, because the construction cost for the Arch structure consumed the entire project budget during the initial phase of Memorial construction in the 1960s.

After submitting the winning competition entry in 1948, Saarinen and Kiley made many modifications to the design of both structure and landscape. During this time, many versions of the site plan were developed; the landscape design gradually changed from the original concept of a symbolic, forested "wilderness" represented in the competition drawings (Figure 3) to the more open lawn areas with reflecting ponds that characterize the site today. Kiley's involvement with the project ceased after NPS

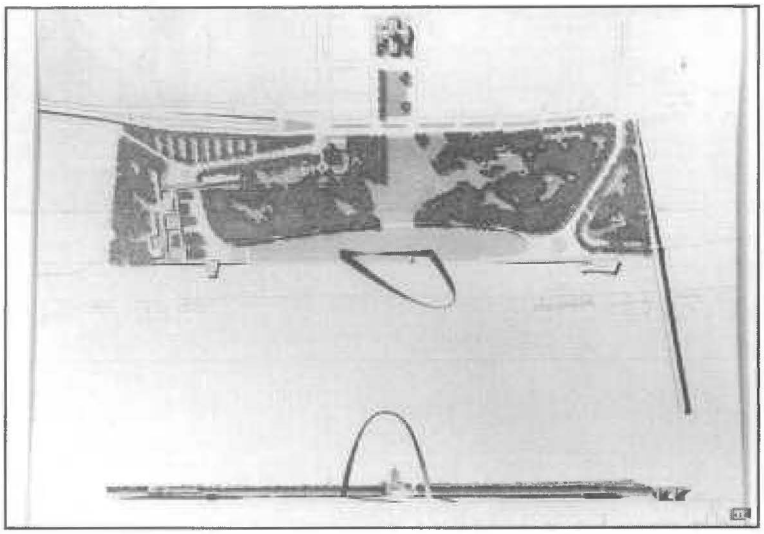

Figure 1. Jefferson National Expansion Memorial. Competition Drawing, 1948. Design by Eero Saarinen and Dan Kiley. (Photo courtesy of the National Park Service)

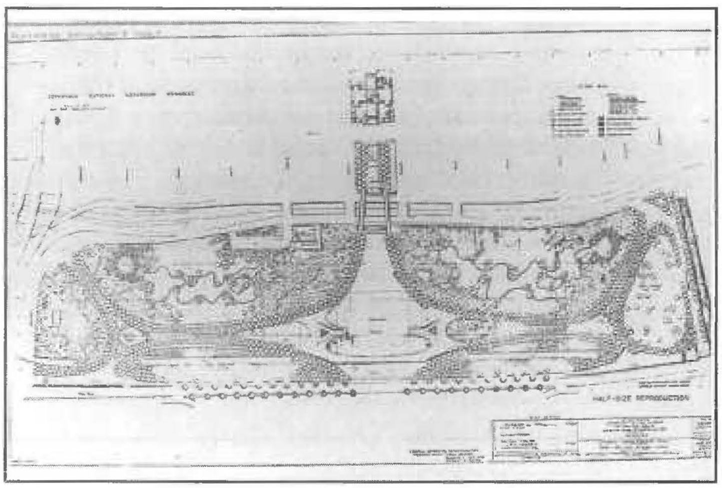

Figure 2. Jefferson National Expansion Memorial. Design Development Drawing by Eero Saarinen and Dan Kiley, 1964, as approved by the National Park Service in 1966. (Photo courtesy of the National Park Service)

Figure 3. Jefferson National Expansion Memorial. Competition Drawing, 1948, illustrating the heavily wooded landscape envisioned in the early stages of the design process. (Photo courtesy of the National Park Service)

acceptance of the design development drawing in 1964. At this point, an in-house staff of landscape architects at the San Francisco Planning and Service Center (which later became the Denver Service Center) assumed control of construction document preparation and supervision of the project. To further complicate matters, some of the construction documents were subsequently prepared under contract by the firm of Harland Bartholomew and Associates in St. Louis.

Although the use of the term "historical" with respect to contemporary designs may seem contradictory to some, the architectural significance of the Arch structure has long been acknowledged. Although the Jefferson National Expansion Memorial is less than fifty years old, it was listed on the National Register of Historic Places in 1966, only a few years after its construction, and designated a National Historic Landmark in 1987. The Memorial grounds, however, had never been considered a historic resource by park management until recently, when an increased national attention to the concept of cultural landscapes encouraged reconsideration of park policy in this regard. The historical significance of the Arch landscape, like the structure, is clearly tied to National Register criterion C, which applies to "properties significant for their physical design or construction, including such elements as architecture, landscape architecture, engineering and artwork."[4]

Unfortunately, as in the case of so many works of the recent past, there is no larger theme study available to provide a framework for evaluating individual designers or their work in a larger context. In this case, however, the argument for significance of the design on its own merits is quite strong. This was the first major public design commission for Saarinen and Kiley, both of whom went on to achieve national and even international reputations. Moreover, this was the first major collaborative project the two men undertook, and the relationship they established in the St. Louis project set a precedent for their continued association in future years. Project correspondence reveals that Saarinen and Kiley worked very closely together during the design process, and Saarinen's office continued in the same pattern after the architect's untimely death in 1961. This relationship resulted in a design that integrated architecture and landscape, reflecting the holistic approach to design Saarinen described in a 1961 interview: "I see architecture not as the building alone but the building in relation to its surroundings."[5]

In general, Kiley's firm had primary responsibility for laying out the entire site plan, including walks, lagoons, plantings, and grading. The evolution of this site plan between 1948 and 1964 occurred over the years in which Kiley was maturing as a designer, developing a preference for the geometrically ordered landscape that is manifested in his major work. [6] Over this period, the landscape design at the Arch became much more spare and simplified, as elements such as the frontier village, symbolic Oregon and Santa Fe trails, tea house and restaurant were dropped from the program. In the 1960s, the site design focused more narrowly on providing a functional circulation system of walkways that reflected the geometry of the Arch, and a dense line of regularly spaced trees in the walks replaced the more naturalistic woodland represented on the competition drawing (Figure 3).

Because of the lengthy and complex construction process on this project, the question of historical significance hinges largely on the issue of integrity, or the degree to which the built landscape reflects the Kiley-Saarinen vision. In 1969, Kiley's design development drawing was used as the basis for a series of construction documents prepared by an NPS design team led by landscape architect John Ronscavage. The NPS team's goal was to implement the approved plan designed by Kiley in 1964 as faithfully as possible, although they were instructed not to contact Kiley directly for fear of incurring consulting fees.[7]

The first phase of construction involved overall site grading, sidewalks, and tree plantings along the north-south axis. When the contract went out for bid, however, local nurserymen objected to the selection of tulip poplar trees because they do not thrive in the St. Louis climate and, therefore, are not readily available at area nurseries.[8] Kiley originally specified the dense monoculture planting of tulip poplars because of their growth characteristics: "I wanted something that soared up, cathedral-like with big, high trunks....I thought the scale of the Arch being 600 feet, an 80-foot tree would be in good scale and give you an elevated feeling too...a classic, spiritual feeling..."[9] (Figure 4). In developing the planting plan, his office staff wrote a series of letters to area horticulturists asking about the hardiness of material on the proposed plant list; the only negative feedback they received on the tulip poplar selection was

the remark that they tend to drop their leaves early in the fall.[10] Because of the strong reaction of the local nurserymen, however, the NPS formed a committee to select an alternate species. This group recommended the use of Rosehill ash, a new white ash cultivar, as a replacement for the tulip poplar. Selection of the replacement variety was apparently based on hardiness and availability rather than aesthetic considerations, since the height of the ash is much lower and the form of the tree more rounded and spreading than the vertical tulip poplar (Figure 5). Kiley was not consulted about the replacement species and recounts that he was "appalled" to hear they had chosen the ash, a tree he considers most "uninteresting."[11] The revised drawings retained the recommended spacing of the trees and the concept of a single species from Kiley's plan.

The local committee also recommended other changes to the original plant list, such as replacing the specified Canadian hemlock with Austrian and white pine. When the firm of Harland Bartholomew and Associates was retained to prepare construction documents for subsequent phases of landscape work, they were instructed to select material from the revised plant list, as modified by the local committee.[12] In future phases of construction documents, the number and spacing of trees in the lawn areas outside the walks were reduced from Kiley plan for security and horticultural reasons.[13]

Other changes include several expensive items that were never built, such as the overpasses over Memorial Drive, two fountains, the grand staircase to the riverfront, and the maintenance structure, which continues to be housed in a temporary metal structure instead of the more inconspicuous earth-sheltered building originally planned. Instead of the surface lot Kiley had designed, a parking garage was built to accommodate more vehicles. Both the garage and maintenance buildings were built in the locations specified by Kiley.

Site detailing generally does not reflect the intention of the original design team, either because the details were not specified at the design development phase or were altered during construction. Although the location and alignment of the walks follow the Kiley plan precisely, the material was never specified;[14] the NPS design team chose the exposed aggregate concrete found at the site today.[15] Kiley had also not specified the light fixtures and other site furnishings, which were selected later by the designers at Harland Bartholomew.[16] Kiley's drawings do, however, provide a detail for the treatment of trees in the walks, which were to be surrounded by cobbles rather than grates (Figure 6). Apparently, the park superintendent objected to the appearance of the cobbles when park staff were installing them and ordered they be replaced with tree grates (Figure 7).

In spite of the length of time over which the landscape plans for the Memorial were developed and implemented, the ultimate Kiley concept, as represented in the 1964 design development drawing, finds expression on the site today. Despite the change in plant material, it is clear that the basic configuration of the Arch landscape is faithful to the designer's intent. National Register criteria recognize seven

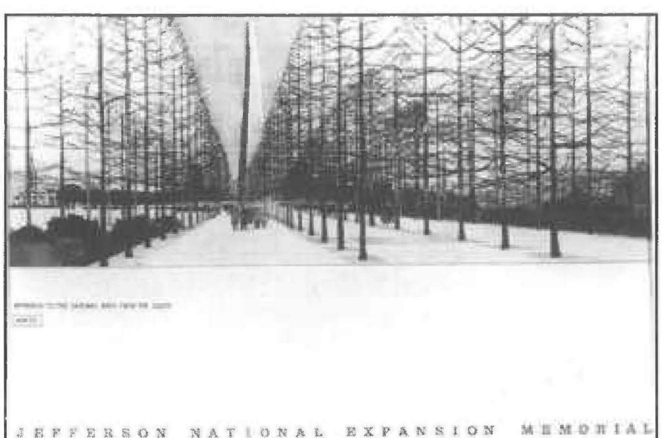

Figure 4. Jefferson National Expansion Memorial. Perspective sketch of the walks lined with tulip poplars. The Office of Dan Kiley, 1962. (Photo courtesy of the National Park Service)

aspects or qualities that define the integrity of a historic property: location, design, setting, materials, workmanship, feeling, and association.[17] Of these, the Arch grounds possess integrity of location, design, setting, feeling, and association. Materials and workmanship are the two categories most subject to change during the lengthy and complicated construction process. Certainly, the replacement of more than 900 tulip poplar trees with white ash is a major alteration that diminished the scale and spatial quality of the walkway canopy. However, the overall concept of the design is of paramount importance on the ninety-one-acre site: the circulation system that reflects the gentle curvature of the Arch, the spatial quality of open lawn areas defined by dense tree plantings, the views of the Arch structured by the plantings and reflected in the lagoons, the grading that subtly screens the railroad line and service functions, the bold simplicity of the planting plan through use of a single dominant species to reinforce the geometry of the walks. The designer himself feels that the most important aspect of the design is the alignment of the walks, reinforced by the dense tree plantings, and indicated that Saarinen concurred with that view.[18]

Although research to date has illuminated the general history of the landscape design, further analysis is needed to determine whether alterations by other designers made during construction have acquired significance and should be considered contributing features or whether they detract from the spatial order intended by Kiley and Saarinen. This is not merely an academic exercise, because these alterations have become the source of major maintenance problems at the park. The Rosehill ash, for example, are subject to pest and disease problems that can only be controlled through the application of chemical pesticides, the use of which is discouraged by current NPS policy. Since the trees will need to be replaced on a cyclical basis, should the NPS consider returning to the designer's recommendation if it is determined the tulip poplar better fulfills the design intent? Or does the material actually planted, the Rosehill ash, take precedence over the design concept? Furthermore, the tree grates, placed half in and half outside the walkway pavement,

Figure 5. Jefferson National Expansion Memorial. Contemporary view of the walkways as constructed with Rosehill white ash. (Photo by Regina Bellavia, November 1994. Courtesy of the National Park Service)

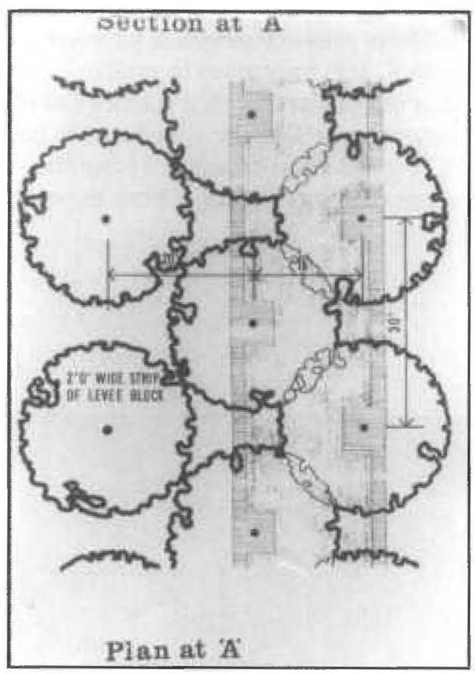

Figure 6. Jefferson National Expansion Memorial. Tree planting detail from Design Development Drawing by Eero Saarinen and Dan Kiley, 1964. (Photo courtesy of the National Park Service)

constitute a tripping hazard and require frequent weeding due to the encroachment of lawn grass into the grate area. Should these grates be removed and replaced with the original design detail, if the latter is determined to be a more functional solution? These are a few of the questions the NPS is facing in the process of preparing a long-range maintenance plan for this important contemporary landscape.

The report and plan will address the issues of significance and integrity as well as propose solutions to problems and concerns that have emerged since construction ended in the 1980s. Regina Bellavia, a landscape architect on the park staff, is responsible for preparing the plan with input from a variety of parties, including Dan Kiley himself. Fortunately, Mr. Kiley has been enthusiastic about the project from the beginning; the Memorial was the first large commission he received after opening his own practice after World War II, and he was eager to clear up some of the lingering misunderstandings about his role in the design. The opportunity to interview the designer and review his files has helped immeasurably to clarify the process through which the Arch landscape evolved from the 1948 competition through design development completed in 1964. Furthermore, we feel that it is important to solicit his advice and suggestions on potential modifications to address post-construction problems that have arisen. It is important to realize, however, that the designer's own memory of his work, however compelling the anecdotes, is not infallible. The project has benefitted from the critical analysis of Gregg Bleam, whose experience as a designer in Kiley's office and as a scholar who has studied his canon of work, allows him to evaluate the project in context with Kiley's larger career and design philosophy. Moreover, the park managers and maintenance staff must play an active role in developing solutions to the problems they deal with on a daily basis. We are hopeful that this collaborative process will result in a long-range plan that will preserve the Memorial as the holistic concept intended by original designers, integrating architecture with landscape, and symbol with function.

Notes

[1] Allan Temko, *Eero Saarinen* (New York: George Biaziller, 1962) as quoted in the brochure for Jefferson National Expansion Memorial (Washington, DC: Government Printing Office).

[2] See Sharon Brown, *Jefferson National Expansion Memorial Administrative History, Part 1* (Washington DC: Government Printing Office, 1984) and George Hartzog, *Battling for the National Parks* (Mt. Kisco, New York: Moyer Bell Ltd., 1988) for account of the design and construction of the arch structure. Part II of the *Jefferson National Expansion Memorial Administrative History*, written by Robert Moore, was as yet unpublished at the time of this article. This volume does address the history of the landscape design and construction.

[3] Diana Balmori, "Cranbrook: The Invisible Landscape," *Journal of the Society of Architectural Historians* 53 (March 1994): 31.

[4] *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation.* (Washington DC: US Department of the Interior, National Park Service, Interagency Resource Division, revised edition, 1990): 17.

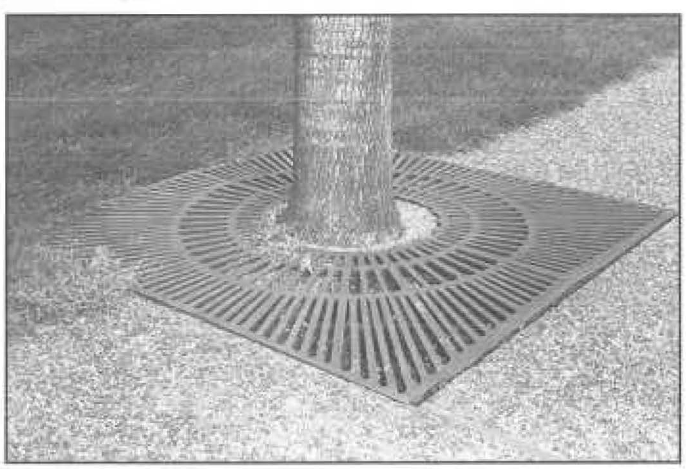

Figure 7. Jefferson National Expansion Memorial. Contemporary view of the tree planting detail as constructed with tree grates. (Photo by Dena Sanford, September 1993. Courtesy of the National Park Service)

[5] Eero Saarinen, interview in *Perspecta Seven* (1961): 32.

[6] Gregg Bleam, "The Work of Dan Kiley," in *Modern Landscape Architecture: A Critical Review*, Marc Treib, ed. (Cambridge, Massachusettes: The MIT Press, 1993), 237.

[7] John Ronscavage and Jim Holland, interview with Regina Bellavia, tape recording 15 November 1994, Denver, Colorado.

[8] Ronscavage interview, 1994.

[9] Dan Kiley, interview with Bob Moore, tape recording 23 July 1993, The Office of Dan Kiley, Charlotte, Vermont.

[10] The proposed plant list was sent by Joe Karr of Dan Kiley's office in May 1963 to local horticultural experts requesting feedback on the proposed plant material. Advice was solicited from the following: The Morton Arboretum; Harland Bartholomew and Associates; St. Louis Department of Parks, Recreation and Forestry; and the Missouri Botanical Gardens. Only Eldridge Lovelace of Harland Bartholomew, in a letter dated 23 May 1963, responded with negative comment about the tulip poplar.

[11] Dan Kiley, interview with author, tape recording 8 June 1991, The Office of Dan Kiley, Charlotte, Vermont.

[12] Eldridge Lovelace interview with Regina Bellavia, tape recording December 1994, St. Louis, Missouri.

[13] Ronscavage interview, 1994.

[14] In a letter dated 25 March 1963, from Saarinen's office to Robert Hall of the NPS Eastern Office of Design and Construction, Robert Detmers discussed the use of water-bound macadam, a form of crushed stone pavement, for the walks, and suggested developing test panels on-site before making a final decision on the paving material. There is no evidence that the test panels were constructed.

[15] Ronscavage interview, 1994.

[16] Ibid.

[17] *National Register Bulletin*, 15, 44.

[18] Kiley interview with author, 1991.

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Preserving the Home and Legacy of James Rose

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It is important to preserve the James Rose residence, now the James Rose Center for Landscape Architectural Research and Design, for two reasons. First, it was the home of one of the founding pioneers of modern American landscape architecture; and second, it is a significant example of a most thorough integration of architecture and landscape - one of the defining issues of modernism in environmental design. Preserving an environment predicated upon a modern conception of the integration of space and time presents significant paradoxes when viewed from a classic preservation perspective. Twentieth-century advances in our thinking about and practice of design, many of which are attributable to James Rose, suggest it is essential to view the issue of preserving this, and perhaps other, important modern environments in a new contemporary framework.

James Rose and the Integration of Space

Along with Dan Kiley and Garrett Eckbo, James Rose is best known for being one of the leaders of the modern revolution in landscape architecture in the mid-1930s. In the subsequent years Kiley and Eckbo developed into well-known practitioners of public and corporate landscape architecture, but the maverick Rose, uncompromisingly individualistic, quickly rejected the public and corporate scene as being too controlled by people who knew nothing about design. He devoted his professional career to the exploration of the meaning of the private garden. Because of taking this path in an era in which professional practice in residential work began to diminish in favor of corporate, public, and environmental commissions, much of the important work of one of American landscape architecture's most colorful and brilliant practitioners is not well-known. Rose's ideas about integration of the landscape and architecture, in general, and the garden and house, in particular, constitute some of the most significant contributions to modern environmental design and remain relevant to this day. We find these ideas present in Rose's theoretical writings from the 1930s on and manifest so clearly in his own house and garden, now a landscape study center, built in suburban Ridgewood, New Jersey, in 1953.

Rose was born on Easter Sunday, 1913, and died on September 16, 1991, at the age of seventy-eight. James was only five when his father died and when, with his mother, and older sister, Virginia, he moved to New York City. He never graduated from high school (because he refused to take music and mechanical drafting) but somehow managed to enroll in agricultural courses at Cornell University and transfer, a few years later, as a special student, to Harvard University to study landscape architecture. It was there he met Kiley and Eckbo, and it was from there he was summarily expelled for refusing to design in the Beaux Arts manner.

Among other achievements Rose wrote four books. In his second, *Modern American Gardens*, published in 1967 under the pseudonym, Marc Snow, Rose described the climate at Harvard in 1936:

The academic smolder over abstract principles of design flamed into an open student revolt. The chief protagonists, Garrett Eckbo, Dan Kiley, and James Rose, on the student side of the drama, seem to have been alternately outraged by the academic restrictions of the Mayflower hierarchy and exultant in having such a beautifully classic adversary against whom to do battle. They experimented secretly, unbeknownst to the landscape faculty, on designs in the forbidden area of the modern idiom. These clandestine experiments were held in Cambridge rooming houses and in the basement of Robinson Hall, somewhat in the manner of early medical students dissecting corpses in secret to gain a firsthand knowledge of anatomy. Like the schoolteacher with eyes in the back of her head, Harvard, on the faculty side of the drama, knew perfectly well what was going on and was not in the least amused.[1]

By this time, Modernism was in full swing in the arts and architecture. In 1937 Richard Hudnut was appointed Dean of the Harvard Architectural School and appointed Walter Gropius as head of the newly-created graduate School of Design. Such modern luminaries as Gideon, Albers, and Breuer, to name a few, came as visiting critics and lecturers. All this stimulation presented an irresistible force to Rose. But the landscape architecture department remained unmoved. In 1990, Rose recollected an incident that precipitated his expulsion. "The assignment was posted on the board and at the bottom it read, 'Anyone attempting a modernistic solution will receive an X.' Well, I did a 'modernistic' solution, got an X; did more 'modernistic' solutions, got more Xs; and eventually they expelled me. I took my Xs to *Pencil Points* magazine, now *Progressive Architecture*, and they gave me a two-year contract!"[2] These seminal articles were among the first to clearly enunciate the modern landscape architectural message. They were written with the same verve and vitality evidenced in Rose's built works, and were devoured by young landscape architects and architects alike.

In "Integration," published in *Pencil Points* in December of 1938, Rose describes a fundamental problem in the contemporary approach to designing the environment that foreshadows his own solution at his Ridgewood home.

> Landscape design exists in an isolated world of never-changing aestheticism....Architects have sinned more progressively. They have built a kind of scenic railway in design where anyone may get a thrill who takes the ride, but after a few nostalgic moments, the passenger is delivered to precisely the point where he got on, and whence he continues the haphazardry of his existence. With a few notable exceptions, architects have made no attempt to express any human experience outside the walls of a building. Houses are now, more than ever, designed as a special entity, wrapped in a package and delivered to the public. No matter how much they may resemble a 'machine for living,' they are still an *objet d'art*, and as such, may provide a momentary thrill and eventually become interesting to collectors, but at present, they have little relation to the rest of the world in which living also occurs.[3]

Rose summarizes by rhetorically asking,

> Isn't it a little inconsistent, and perhaps, unfair, to expect a Twentieth Century individual to step out of a stream-lined automobile, and then flounder through a Rousseauian wilderness until he reaches a 'machine for living'? We cannot confine living, which is a process, to little segregated compartments that end at the edge of the nearest terrace where we are again asked to adjust ourselves to what, in its highest form, becomes an Eighteenth Century landscape painting.[4]

Rose concludes his argument by calling for "...forgetting the mean, little professional boundaries which we have inherited from the stagnant era, and developing continuity in our environment expressive of Twentieth Century communal needs."[5]

It was again in *Pencil Points* in April of 1939, in an article entitled, "Plant Forms and Space," where Rose asserted,

> Space is the constant in all three dimensional design, but a realization of space is not possible until it is defined by materials. In both architecture and landscape, material plus space create a volume through which human beings circulate and carry on the functions of living.[6]

While Rose goes on to discuss the differences in materials for landscape and architecture, it is key to understanding the importance of his approach to design to recognize that for Rose the differences between architecture and landscape were not as important as the similarities.

Rose goes on in this article to criticize most architects' view of the landscape.

> 'Ah, wilderness!,' murmurs the architect, as he looks at the panoramic view of 'billowy foliage' through a thirty-foot expanse of glass with steel supports. 'Complete wilderness,' he echoes, and

the stillness is broken only by the radio and the shrill train whistle at the town station....[7]

Rose continues, describing the architect as one who is:

> ...preoccupied with that which occurs within the shell of a building, and can see no justification for design which has no compulsion of shelter. He forgets that the real purpose of design is to facilitate the activity of men. He forgets that although shelter has compulsion, there is no compulsion whatever about having architects to provide it. Shelter would occur with or without architects just as the landscape is humanized wherever man goes - with or without advice from the landscaper....[8]

It would be inaccurate to claim there were no architects dealing with the issue of integration. Perhaps first among them was Frank Lloyd Wright whose houses are famous for their integration with their sites. Rose wrote of Wright, "Wright himself had the great gift of making the landscape inseparable from his buildings to a degree probably equaled by no other architect of this century or in any country."[9] But Rose went on to state,

> Wright was not as interested in creating gardens or landscapes as he was in integrating the natural environment with the design of his houses. Certainly, he was not interested in making his houses part of a garden.[10]

Mies van der Rohe's Barcelona Pavilion and subsequent houses evidenced explorations of architectural space having an abstract relationship with nature. But again, we find no interest in designing the out-of-doors as a real place for modern living. Rudolph Schindler and Richard Neutra extended interior architectural space through walls that serve as little more than vapor barriers into the landscape, then designed the out-of-doors for California living. Of Neutra, Rose wrote:

> Neutra, on the other hand, an architect of the International School, was not handicapped by landscape training at all, but rather by an enthusiasm for gardening that was irrepressible. Seldom has an architect appeared on the scene with such rigid tenets of design and building in the modern idiom. With a brilliant mind, tenacious and undeviating as a bear trap, as far as buildings were concerned, Neutra could relax utterly as a kind of antidote when it came to his gardens.[11]

Eero Saarinen's and Dan Kiley's Miller house and garden, built shortly after Rose's Ridgewood home, is a famous example of integration of interior and exterior space. Kiley describes the garden conception simply.

> The house was designed in functional blocks, such as the kitchen, the dining room, the master bedroom, and the living room. So I took this same geometry and made rooms outside using trees in groves and allees.[12]

These and a handful of other explorations focused on relating shelter to nature; or on integrating house and garden by bringing the out of doors in or extending the interior architectural logic out.

The Rose Environment - Integration in Space and Time

In the case of the Rose residence, we find a unified conception of architectural and landscape space from the start. Furthermore, this conception acknowledges the inevitability of change in time while creating continuous interlocking spatial experience which, in Rose's words, is "...neither landscape nor architecture, but both; neither indoors nor outdoors, but both. And this may be the message held in the emptiness-between the lines drawn by materials."[13]

Rose began the design while in Okinawa during World War II with a model he made from scraps found in construction battalion headquarters (Figure 1). Later he described his thinking in an article published in *American Home* magazine in 1943. In it he wrote:

> I wanted a structural pattern as plastic as good sculpture- large and open enough to wander through. I wanted to be able to wonder whether I was indoors or out on fine cool days and yet be snugly insulated from the heat and cold. I wanted the sensations one feels in passing from concrete paving to pine needles and earth. I wanted the spaces flowing easily from one to another, divided for privacy and for convenience. I wanted the arrangement flexible and varied. Most of all I wanted all this to be integrated with the site in a design that seemed to grow, to mature, to renew itself as all living things do.[14]

His premise was,

> ...to go at the construction as you might a painting or a piece of sculpture...to set up a basic armature of walls and roofs, and open spaces to establish their relationships, but leave it free to allow for improvisation. In that way it would never be 'finished' but constantly evolving from one stage to the next- a metamorphosis such as we find, commonly, in nature[15] (Figure 2).

Figure 1. James Rose holding a model of his spatial conception made from scraps during World War II, Okinawa, Japan. (James C. Rose Archives)

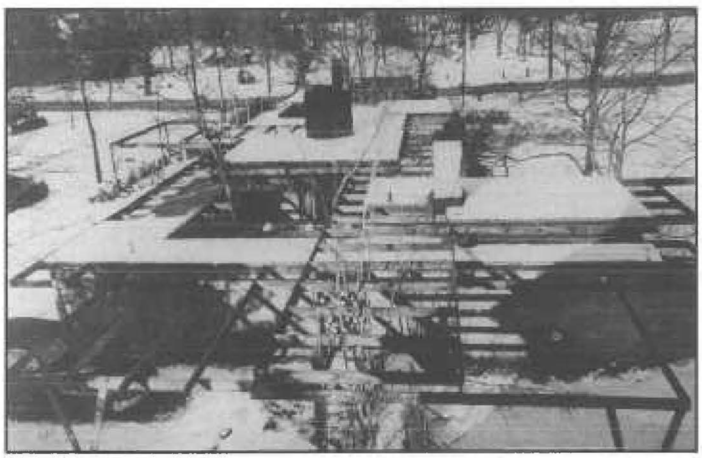

Figure 2. James Rose, "Rose Residence, Showing Central Armature with Adjoining Spaces," circa 1954, Ridgewood, New Jersey. (James C. Rose Archives)

Rose described it as a "tiny village" constructed on an area half the size of a tennis court. In it Rose had a private studio on the north of the property, while his mother occupied the central part of the dwelling and his step-sister resided in the "apartment" on the south (Figure 3).

Consistent with his theory of flexibility, the structure changed dramatically during the forty years since it was built. Figures 4 and 5 illustrate essentially the same view from the living room to the east garden, separated by thirty years of vital living.

From his first real trip to Japan in 1960 (Rose did not credit his time on Okinawa during World War II with teaching him anything about Japanese culture) and many subsequent trips, Rose became interested in Japanese culture and became a practicing Zen Buddhist. This influence on Rose was profound and is reflected in the changes the Rose residence underwent in subsequent years. It remains, however, an American environment in suburban New Jersey.[16]

In the addition of the roof garden in the early 1970s, Rose gets still more space for people from his one-half-a-tennis-court. Here he compares the filigrees of plant forms to the filigrees of structures. "In the bare architectural outline is a pattern of organic (rather than cosmetic) decoration and an integral division of space"[17] (Figure 6).

Issues in Preservation

As in all his designs, at his own home Rose designed and built to be flexible, so as to accommodate rapid twentieth-century changes in both the environment and people's needs. In the period before and immediately after his death, the structure, built to accommodate rapid change fell into rapid disrepair. Before he passed away, Rose set in motion an idea he had

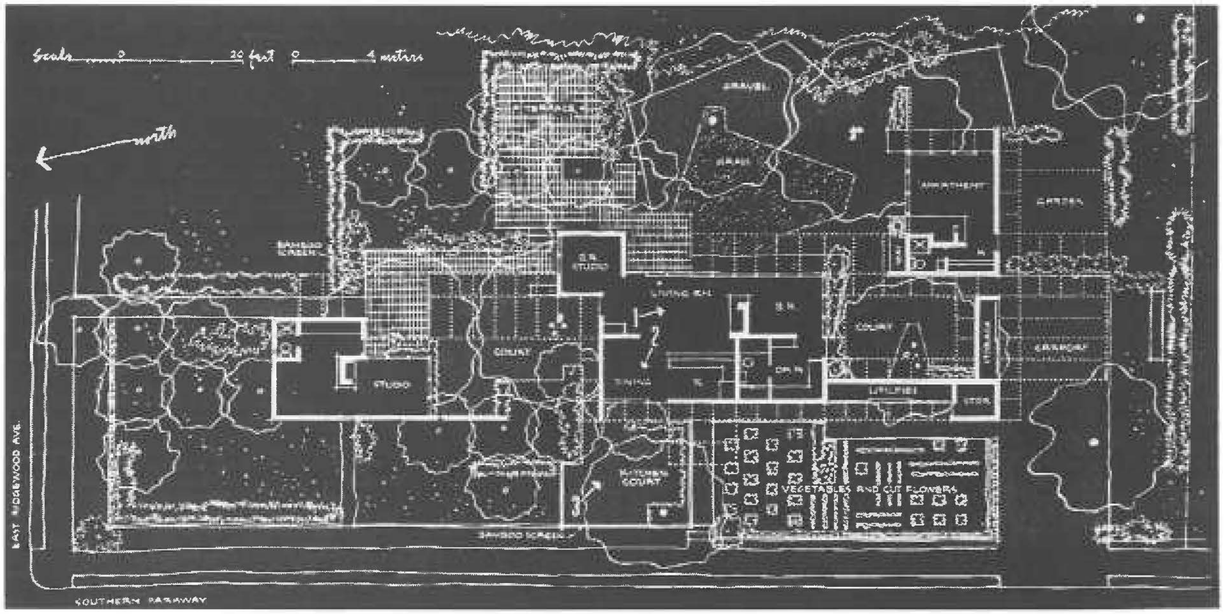

Figure 3. James Rose, "Plan of Rose Residence," Ridgewood, New Jersey (James C. Rose Archives)

Figure 4. James Rose, "1950s View from inside Rose Residence," Ridgewood, New Jersey. (James C. Rose Archives)

Figure 5. James Rose, "1980s View from inside Rose Residence Looking East," Ridgewood, New Jersey. (James C. Rose Archives)

Figure 6. James Rose, "Rose Residence Roof Garden," circa 1970, Ridgewood, New Jersey. (James C. Rose Archives)

been considering for many years - to convert his home into a landscape research and study center, intended to serve as a place of meditation, retreat and exploration for other's self-discovery; and particularly to assist students struggling with environmental design issues in the contemporary world. It is one goal of this center to revive the Rose home *cum* study center without losing the vitality that created and sustained it during his life.

In the case of this environment based upon a fully integrated conception of space in time, the issue of preservation is a new problem. Since it was the insight of James Rose that continuously sparked this dynamic environment since Okinawa, it is appropriate to look to him for guidance. Rose himself wrote of an encounter he had with the problem of historic preservation in 1940 in *California Arts and Architecture*:

> We talked a great deal about what could be done to preserve the original character....And then we discovered something important. The old place had vitality because it had been produced from the necessities for vital living....All that had changed, as living things do, as now we have a new problem. And so without subterfuge, we met the new conditions just as I feel sure the earlier pioneers must have done. We allowed it to grow out of the present necessities for vital living.[18]

Of his Ridgewood home Rose wrote,

> Change is the essence. To reveal what is always there is the trick. The metamorphosis is seen minute by minute, season by season, year by year. Through this looking glass, 'finish' is another word for death.[19]

So, I would add would be a classic definition of "preservation." The design intent of Rose was that his home change with the times and needs of its users. Even with him gone, it is inconsistent with this intent to answer the contemporary question of how to "preserve" with a formaldehyde solution this modern environment of this important design theorist and practitioner.

The Board of the James Rose Center for Landscape Architectural Research and Design has determined first to be true to Rose's design intent, however ethereal, rather than any specifics of the design - to preserve the fluidity of space and change that is the paradox at the heart of this preservation problem. We have developed a plan, with the help of the University of Massachusetts Department of Landscape Architecture and Regional Planning, to be used as a general guide only, from which we may vary as we see fit. Immediate stabilization of the materials has been a primary consideration, since they have been in a state of serious degeneration. As we move to stabilize the structure we have been considering the changes needed to function as a landscape research and study center, carefully weighing the needed changes along with the need to express this fine example of modern environmental design.

We have breathed new life, literally, into the spaces; they are currently occupied by a young landscape architect and visited and used by

Figure 7. James Rose, "1991 View from outside Rose Residence Looking West," Ridgewood, New Jersey. (James C. Rose Archives)

students, scholars and the general public. We have made emergency repairs to fences, pools, lights and many other elements; but still some pools are leaking, plantings are suffering and the roof garden is collapsing. We have formed a local advisory group and opened the center to the local community. We have documented much of Rose's important professional work (Rose designed and built scores of important modern gardens in the area), for the James Rose Center is, perhaps more than anything, a repository for the significant ideas of one of the most important practitioners of modern landscape architecture. Preserving *and* developing these ideas is at the heart of our mission. Vital living requires both.

As the Center's director I hope we will be able to turn the corner into the twenty-first century while preserving the spirit that created this unique modern environment. If, in our contemporary world, we are to develop meaningful approaches to preserving our modern heritage, it will be helpful to remember Rose's appraisal of his own times written in the 1940s.

> We have begun the expression of a new age which has all the dignity and some of the greatness of ancient Greek, Medieval and Renaissance art. It is nevertheless based on a different social order and a different source of inspiration. It therefore must be judged by different standards. When thinking and living become completely unified with the process, it will be an indigenous expression of our times with fair opportunity of surpassing any of the previous periods in stature and quality. We must first know and live within our own civilization, rather than beam at it intelligently, like the faces in a cozy painting. We must get rid of the almost unconscious snobbishness which makes us imagine we are getting 'culture' at the opera while completely blind to the inventive miracles of the amusement park and the department store. When we look at things again with a fresh view rather than that of an art catalogue, we will know instinctively when to laugh and when not to laugh at Picasso, and how to build our gardens.[20]

And how to preserve our modern heritage.

Notes

[1] Marc Snow [James Rose], *Modern American Gardens: Designed by James Rose* (New York, New York: Reinhold Publishing Corporation, 1967), 17-19.

[2] James C. Rose, personal interview, July 1991.

[3] Rose, James C. "Integration," *Pencil Points* 19 (1938): 759.

[4] Ibid.

[5] Ibid, 760.

[6] James C. Rose, "Plant Forms In Space," *Pencil Points* (April 1939), 227.

[7] Ibid, 228.

[8] Ibid.

[9] Snow [Rose], 78.

[10] Ibid.

[11] Ibid, 81.

[12] Marc Trieb, editor, *Modern Landscape Architecture: A Critical Review* (Cambridge, Massachusetts: MIT Press, 1993), 233-234.

[13] James C. Rose, *The Heavenly Environment* (Hong Kong: Athens Art Publishing Company, 1987), 96.

[14] Ibid, 90.

[15] James C. Rose, *Creative Gardens* (New York, New York: 1958), 111.

[16] James C. Rose, *Gardens Make Me Laugh* (Norwalk, Connecticut: Silvermine Publishers, 1965), 21. Rose once responded to a woman who asked him if he could do a Japanese garden for her with, "Of course, whereabouts in Japan do you live?"

[17] Rose, *Heavenly Environment*, 112.

[18] James C. Rose, "Bogeys in the Landscape," *California Arts and Architecture* 57 (1940), 27.

[19] Rose, *The Heavenly Environment*, 106.

[20] James C. Rose, "Gardens," *California Arts and Architecture* 57 (1940), 20.

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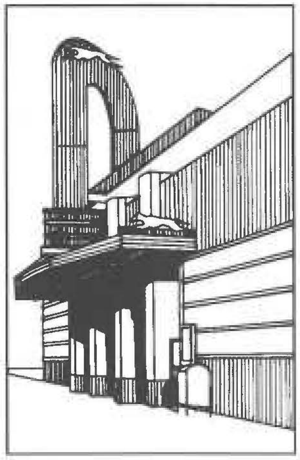
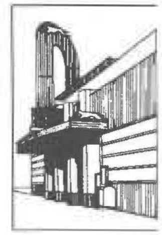


Preservation Solutions for Institutions

Brown v. The Board of Education of Topeka: Strategies for Schoolhouse Restoration/Rehabilitation/Reuse, *Cheryl Brown Henderson*

Establishing a Historic Preservation Framework Within Campus Management and Planning, *Stephen L. Chambers, Ph.D.*



Brown v. The Board of Education of Topeka: Strategies for Schoolhouse Restoration/Rehabilitation/Reuse

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The U.S. Supreme Court decision of 17 May 1954, *Oliver Brown et al. v. The Board of Education of Topeka, (Kansas)*, is thought to be one of the most significant events in the history of this country, yet it remains largely misunderstood. Prior to 1990 few attempts had been made to commemorate and interpret this history through properties associated with legal or personal aspects of the case.

The first effort to identify sites that contributed to Brown, began in 1985 when Justice Warren Burger, former Chief Justice of the United States Supreme Court, called upon the National Park Service (NPS) to conduct a survey of properties associated with the U.S. Constitution. The resulting document entitled *A Constitutional Theme Study* was published by the National Park Service in 1987 to coincide with the anniversary of the Constitution.

To prepare this study, the author Dr. Harry Butowsky, an historian with the National Park Service, convened a panel of Constitutional scholars and canvased federal judges to develop a list of constitutional milestones. *Brown v. Board of Education* consistently appeared among their top three choices. His research entailed identifying properties associated with these milestones. For his selection of sites in Brown, he focused on the residence of Oliver Brown (no longer standing) and Sumner Elementary, the school that had denied Mr. Brown the right to enroll his daughter solely on the basis of their race. At that point Dr. Butowsky was unaware of the social history behind the legal history of *Brown*.

Examinations of this case seldom deal with the complex constitutional issues or the history that underscores the sacrifice and self determination present in the African American community. Even fewer accounts of the *Brown* decision provide information about the specifics of the Topeka case, such as the local National Association for the Advancement of Colored People (NAACP) leadership, attorneys, the thirteen plaintiffs representing their twenty children, and those unknown individuals whose lives were changed by these events. History books make little mention that *Brown* is made up of five cases from the states of Delaware, Kansas, South Carolina, Virginia, and the District of Columbia.

As early as 1849 with a case in Boston, Massachusetts, African American parents challenged the system of education in the United States which mandated separate schools for their children based solely on race. In Kansas alone there were eleven school integration cases dating from 1881 to 1949, prior to *Brown* in 1954. In many instances the schools for African American children were substandard facilities with out-of-date textbooks and often no basic school supplies. What was not in question was the dedication and qualifications of the African American teachers and principals assigned to these schools.

In response to numerous unsuccessful attempts to ensure equal opportunities for all children, African American community leaders and organizations across the country stepped up efforts to change the educational system. In the fall of 1951, members of the Topeka, Kansas, Chapter of the NAACP agreed again to challenge the "separate but equal" doctrine governing public education. The strategy was conceived by the chapter president and the law firm

of Scott, Scott, Scott and Jackson.

Their plan involved enlisting the support of fellow NAACP members and personal friends as plaintiffs in what would be a class action suit filed against the Board of Education of Topeka Public Schools. A group of thirteen parents agreed to participate on behalf of their twenty children. Individuals in the Topeka case moved ahead, unaware that at the same time legal counsel for the NAACP headquarters was representing plaintiffs in school cases from Delaware, Virginia, South Carolina and Washington DC. When the Topeka case made its way to the United States Supreme Court it was combined with these other NAACP cases. The combined cases became known as *Oliver L. Brown et al. v. The Board of Education of Topeka (KS)*. Children of the Topeka plaintiffs had to travel past and away from nearby schools to attend schools designated for African Americans. In the other cases outside of Kansas, African American children attended poor facilities without basic school equipment.

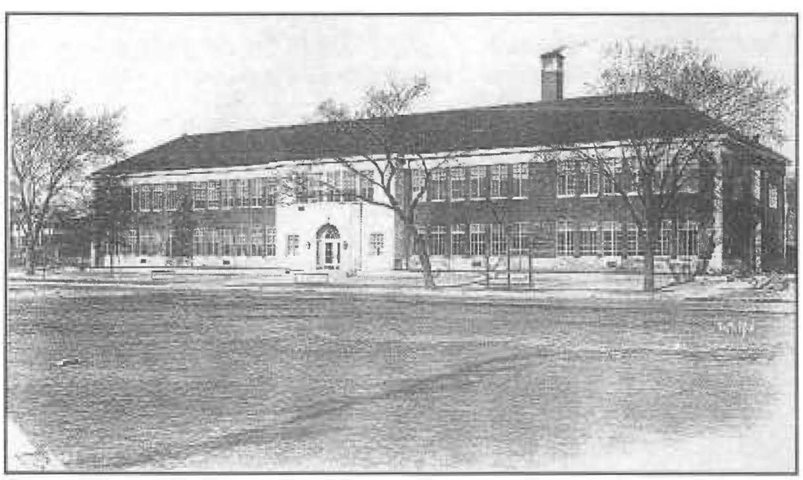
On May 17, 1954, at 12:52 PM, the United States Supreme Court issued a unanimous decision that it was unconstitutional, violating the Fourteenth Amendment, to separate children in public schools for no other reason than their race.

Prior to 1954, Topeka, Kansas, operated a dual system of public education. It was a dual system at several levels. First, only elementary schools were racially segregated. Secondly, junior high and senior high schools were integrated for academics but not for extra-curricular activity. Topeka operated four elementary schools for African American children, compared with eighteen elementary schools for white children.

The plaintiffs in the Topeka case were parents who had children in three of the four African American schools (Buchanan, McKinley, and Monroe Elementary). All three of these school buildings remain standing. However, they have been purchased and converted for other uses. In 1990, one of those buildings, Monroe Elementary, was to be auctioned by its owner. At that point, the Brown Foundation interceded. The unwanted property had to be saved. The owner was unaware of its historic significance as a site associated with the Brown decision.

Monroe Elementary School, just as its counterparts, was built solely to function as a segregated school for African American children. It had existed on the same site in various incarnations since 1868. The present structure was completed in 1927. In the 1940s and 1950s three of the plaintiffs, including Oliver Brown, had children attending Monroe Elementary during the court proceedings in Brown.

The sudden availability of the property and the sense of urgency created by the proposed auction presented a supreme challenge for the Brown Foundation. The Foundation was in its infancy, having been established in 1988. The fiscal resources to acquire and rehabilitate the old schoolhouse were well beyond reach.



Monroe Elementary School, Topeka, Kansas

Consequently, the Foundation leadership launched a letter writing campaign. Letters were sent to wealthy individuals across the country asking for assistance. The idea was to have someone purchase the property and agree to sell it to the Brown Foundation over a period of time. When that concept failed to generate interest, local land speculators were contacted, again without success. Finally an idea was formulated based on the significance of *Brown v. Board of Education* in US history. With that in mind, letters were sent to the Kansas delegation to the US Congress. Several members responded immediately offering suggestions of grant opportunities and organizations to contact.

The turning point of this preservation effort came when the Foundation was put in touch with the Afro-American Institute for Historic Preservation and Community Development in Washington, DC. At that same time, contact was made with the author of the NPS *Constitutional Theme Study*, suggesting that there had been an oversight in his research. It was further suggested that he return to Topeka to research the formerly segregated African American schools for inclusion in his original document.

During a meeting with the author of the study, he suggested that because of the historic significance of the old school building and its endangered status, the National Park Service might be interested in preserving it. He spoke of this property becoming a National Historic Site, i.e., a national park. To make that happen, the Foundation would have to enlist the support and cooperation of both the US Congress and the US Department of Interior.

Realizing the need for local support, the Foundation developed a community task force for the purpose of brainstorming, letter writing, and moral support. Contacts were made with the Brown plaintiffs, Monroe Neighborhood Improvement Association, other civic and social clubs, local preservation groups, the city economic development office and the mayor's office, the local university, sororities and fraternities, the state historical society, and the state legislature.

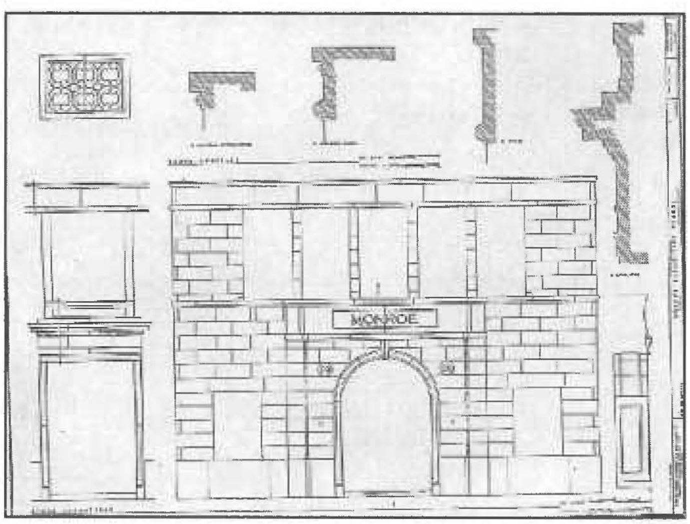
By September of 1990, a task force was in place and the work to convert the vacant schoolhouse into a National Park began. For the sake of brevity the process in its entirety was as follows:

Fall 1990

Letter writing campaign to ask Kansas congressional delegation to direct the NPS to conduct a study to determine the suitability and feasibility of using the Monroe School Building as a national park.

Met with Under Secretary of Interior, Director of National Park Service, and Associate Director for Cultural Resources to update them on local efforts and the need for funding once the study was requested.

The Foundation located funds, via the congressional delegation, to have NPS conduct the study.



Excerpt from the Historic American Building Survey for the Monroe Elementary School, Topeka, Kansas.

Spring 1991

NPS study team arrived in Topeka for initial assessment.

Foundation submitted a position paper to study team, outlining preference for how the site might develop.

Summer 1991

NPS study team conducted on-site research to complete suitability and feasibility document.

Fall 1991

Foundation requested clarification and assistance from the Kansas State Historical Society on the application process for National Historic Landmark (NHL) designation.

Made presentation before the NPS Advisory Board to request NHL designation.

Received official notification of NHL designation in November 1991. Held local news conference to provide a forum for the Assistant Secretary of Interior for Fish, Wildlife, and Parks to make the announcement in person. At that time the position was held by the former Governor of Kansas.

Met with officials of the Trust for Public Lands to interest them in an option on the property to ensure the owner of a sale.

Spring 1992

The Foundation developed draft legislation to be used as a concept for establishing a national park at the site of Monroe Elementary School.

Met with congressional delegation staff and assistant to the Secretary for Fish, Wildlife, and Parks.

Foundation convened ceremony to dedicate the Monroe Elementary School as a National Historic Landmark.

Summer 1992

Congressional delegation staff and Foundation prepare legislation to be introduced.

Legislation introduced in the US Senate in July.

Senate hearing on legislation convened in August. Brown Foundation provides testimony.

Legislation passed in the Senate .

Fall 1992

Legislation introduced in the House. Special hearing convened.

Legislation passed in the House.

President George Bush signs the *Brown v. Board of Education National Historic Site Act of 1992* into law on 26 October 1992.

Spring 1993

NPS appoints a planning team including representation from the Brown Foundation.

Planning team begins work on site.

Brown Foundation enters into a Cooperative Agreement with the National Park Service for planning and programs.

1994 - 1997

Planning process continues to determine management, historic interpretation and building usage.

Projected opening for the *Brown v. Board of Education National Historic Site* in late 1997.

The old schoolhouse would be used as a visitors center with interpretive exhibits, special programs, a resource library, NPS and Brown Foundation offices, a gift shop, and meeting space.

Establishing a Historic Preservation Framework Within Campus Management and Planning

Stephen L. Chambers

On The College Steps

The autumn twilight hangs abroad o'er all
The land, cool, dark, and beautiful. One star
Glides up the reach of silent, mystic sky,
And from the plains steals in a southern breeze.
A faint glow fires the west and 'gainst its light
Tall, black, and shadowy, the College stands.
And sitting here upon the steps which make
A dim, white bulk amid the darker gloom,
A dream, born of the twilight, fills my heart—
A dream of all the faces which have passed
In these portals, and come forth again
In armor strong, invincible, to meet
The world. Scattered afar are they o'er all
The empires. Here and there a name we know.
At other names which rang within these walls
The tears come up; and scent of funeral flowers
Sweet, sad, and heavy, drifts across the heart
With secret pain. Ah, every nook and stone
Of this old college holds a memory,
Either gold or grey, of hopes born here
Which led their eager followers to fame,
Or vain regret of those who missed the goal;
And we who mount these steps to climb and strive
Who knows what life shall hold for us? For when
Shall be the bay leaves, whose the quiet grave?
The twilight falls to darkness, and the stars
Faithful, unchangeable, true symbols of
The Care Supreme, shine over all with their
External, silent whisper, "It is well."
(Cited in Rulon, 1975)

"On the College Steps" was written by Vingie E. Roe in 1902, as a student at Oklahoma State University. The poem is about Old Central (circa 1894) at Oklahoma State University. Although she had one building in mind when writing the poem, its context also portrays the intimate association a multitude of others possess toward certain college landmarks. To the many who are familiar with such places, these are not simply structures of brick, stone, and wood, they are, foremost, areas which draw from within us an image of an era long past, a sense of personal meaningfulness and identification in the present, and an optimism about future civilization. The poem ends with the implication that such a splendid place is under divine protection—"care supreme"—and that all other facets of the higher educational process will continue as long as "it is well." The difficulty of keeping this ideal alive is increasingly being encountered by college and university facilities managers and planners.

Introduction

Today, campus management and planning professionals are becoming better acquainted with historic preservation issues, for two primary reasons. First, a large number of colleges are realizing that some of their facilities are reaching eligibility for listing on the National Register of Historic Places, and thereby receiving public recognition of the value of preserving these properties. Second, campus expansion may mean acquiring adjacent areas which contain historic properties, and those properties must be considered within planning processes.

Most often, familiarity with historic preservation issues is learned along the way, project to project. The constraints and demands presented by preservationists may at times seem ridiculous to those in charge of maintaining cost effective, functionally efficient buildings. Along with historic value and sentimentality, legal statutes raise considerations not encountered in new construction or renovation of nonhistoric buildings. Facilities professionals may at times feel frustrated with viewpoints that some term "hysterical" preservation.

If unaware of various implications, such professionals also may encounter a public outcry that a particular hall should not be torn down, or a tract of land having some historic houses should not make way for a new campus complex. At worst, the uninformed professional may take irreversible actions that may be illegal and as such are not in the best interest of the institution or his/her career.

This paper is intended to provide an overview of historic preservation as it relates to campus management and planning. It seeks to inform professionals of potential opportunities as well as pitfalls. This overview covers some pertinent areas that may assist facilities professionals by providing a better grasp of preservation issues and examples of how other colleges have approached similar circumstances. Further, this article focuses on a

general process by which colleges can incorporate historic preservation into campus master planning.

Background

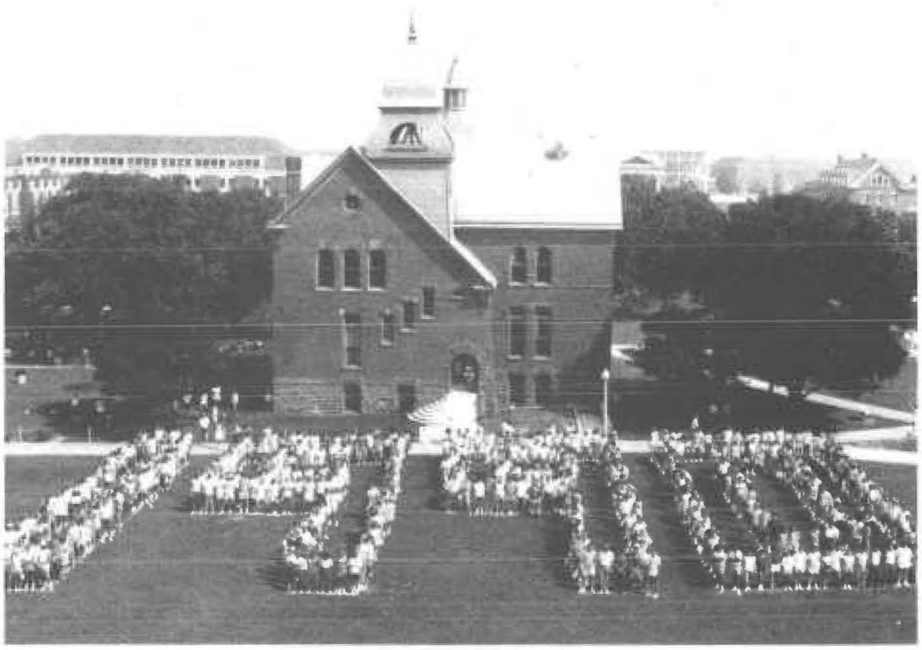
It is common knowledge among campus planners that America's higher education facilities are in a desperate financial struggle (Helpern, 1987). This great need for infusion of funds into the basic physical plant of colleges comes at a time when many for the first time possess properties which have reached eligibility for listing on the National Register of Historic Places. Reviewing campus vitality while at the same time preserving historic properties need not be opposing goals when both goals are thoroughly understood and a framework for historic preservation is integrated into master planning.

Obtaining National Register status renders a public recognition of the historic significance of a property. Such an acknowledgement can place colleges in a perpetual caretaker role with which many may be uncomfortable. Guidelines are recommended for the rehabilitation of registered buildings. This status does not mean that registered buildings may never be altered, but doing so to a substantial degree may cause removal of the building from the register. Associated federal and state compliance requirements can vary according to the particular circumstances.

Several decades ago, only a modest number of institutions with the oldest of ivy-covered buildings had to pay much attention to historic preservation concerns. In more recent times, however, hundreds of other colleges have been or will be made aware that they too must address this issue in planning. This trend is reflected by the National Register of Historic Places, which reports that a total of 628 properties owned by institutions of higher education have been listed since its inception in 1966 through 1988. Of this total, 46 percent were listed in the 1980s (Noble, 1988). Some of these properties were a single building; others included campus districts with multiple buildings. It is apparent that in the coming years, hundreds of other colleges may have National Register listings of properties and will be almost inescapably involved in historic preservation issues.

Despite such a large number of colleges with properties listed on the National Register, the record of American college and historic preservation has been mixed. Relations with preservationists have at some colleges been marked with disagreements, strife, and law suits. Other colleges have warmly greeted and profited from well-thought-out preservation planning.

The need to preserve in recent years has been amplified by the earlier widespread practices of college administrations in compromising historical considerations in campus development. The 1950s was an era of proclaimed "modernization." Along with this modernization process, many older buildings were perceived as somehow "inferior" and either demolished or altered beyond recognition. Preservation concerns received even lower priority in



Old Central has changed little in appearance since its completion in 1894, as compared to serving as the background to a 1986 photo taken of the class of 1990.

Photos courtesy of Centennial Histories Project, Oklahoma State University

the 1960s and early 1970s as colleges expanded to meet the requirements of the baby-boom generation (Wagner, 1984).

That impact has affected not only historic campus properties, but has also extended into adjacent neighborhoods. In fact, the greatest danger to American historic preservation lies not with how colleges treat their own buildings, but with the leveling of nearby historic properties swallowed up by space-hungry institutions. One example is George Washington University's consumption of nineteen blocks of Washington, D.C., where once stood turn-of-the-century townhouses and homes (Russell, 1983). Similarly, the University of Arizona and the City of Tucson currently have plans for expansion over some properties which are listed or are in the process of being nominated to the National Register (Husband, 1989).

Where clashes have occurred, the most likely outcome has been that the college changes its plan or suffers the effects of negative public relations and image building. Stephanie Russell's 1983 article in *Historic Preservation* magazine, entitled "When Campus and Community Collide," provides a remarkable overview of cases which have received considerable attention, including one at Harvard University. In 1979, Harvard University sternly opposed a move by the Cambridge Historical Commission to nominate a number of campus buildings to the National Register (Russell, 1983). Communications deteriorated, and Harvard filed suit to block the nomination. Harvard ultimately reversed its ground and hired its own architect to conduct a survey of properties for nomination.

In 1976, the University of California at Berkeley found out how fast public sentiment can rally when it reversed plans to demolish a 1914 Naval Architectural Building for a new engineering center (Russell, 1983).

But sometimes public reaction has not kept colleges from tearing down historic buildings. Several examples include Northwest University, in Illinois, razing five historic buildings in 1980 to build a new dormitory (Russell, 1983); Central Baptist College, Arkansas, tearing down its Old Main in 1984 because repair costs would exceed new construction (Arkansas Historic Preservation Program, 1986); and Arizona State University demolishing a 1910 architecture annex (the Josephine Frankenberg House) to construct, ironically enough, a new building for the College of Architecture and Environmental Design (Patterson, 1985).

Other colleges have been more eager to pursue preservation. Some buildings, such as the 1852 Ballou Hall at Tufts University, have received careful attention for well over a century and "remained safe in the care of respectful and appreciative educators" (Tolles, 1973). In 1980, the entire campus of Cornell College, in Iowa, was listed on the National Register (Wagner, 1984). Davidson College in North Carolina has renovated forty-four historic buildings, including a 140-year-old inn (Jordan, 1978). The University of the South at Sewanee, Tennessee, has undertaken extensive renovation and restoration of its collection of nineteenth century Gothic architecture, and reaped considerable acclaim for its responsiveness (Chitty, 1979). At the University of Virginia, extensive detail is devoted to

stabilizing and restoring where possible the early 1800s original campus buildings designed by Thomas Jefferson (Howard, 1986).

Other colleges have sensitively restored or renovated historic buildings. Examples include the 1889 auditorium building at Roosevelt University (Perlman, 1972); the nineteenth century "inner city" at Stanford University (Allen, 1978); the 1873 Hall of Languages at Syracuse University (Architectural Record, 1981); and the 1892 Alexander Hall at Princeton University (Ryder, 1987). Additionally, a number of colleges have historic preservation sections in their master-planning documents, including Northern Arizona University (Robertson, 1990), the University of Wisconsin, Virginia Commonwealth University, the University of Chicago, and Gallaudet College (Russell, 1983).

A Framework

At times perplexed, at times moving in two directions simultaneously, the academic milieu is fruitful ground for a specialized type of confusion. By and large, colleges take enormous pride in having reached sufficient maturity to have districts or buildings which acclaim a heritage and testify to campus history. Colleges also want to be perceived as progressive organizations aligned more to future success than to counting past accolades. Yet institutions of higher learning must nurture an image of the pursuit of "new" knowledge. But that in part means providing a visible appreciation for history, particularly when it is their own heritage that is at stake.

Perhaps, some of this confusion may be avoided, or at least reduced, by first realizing that the dilemma exists, or if it does not currently, it likely will in five or ten years. Undertaking a deliberate series of steps to gain the information necessary for consistent planning and decision making may alleviate the confusion. For this purpose, the following process is recommended:

Survey

The initial step in integrating historic preservation into campus management and planning is to determine what historic elements exist on campus and within other areas which may possibly be acquired at some future point. The survey should be undertaken by only qualified historic preservation professionals. Those with training in college architecture and planning are particularly suited to this type of task. Expertise may be found within the institution or through consultants.

Identification and evaluation of campus historic properties can be an involved procedure. First, those conducting the survey must have a good grasp of the college's history and how the campus development has occurred. Within this context, original architectural blueprints and any schematics of alterations must be examined. Campus maps with the dates and acreage of land acquisitions may be beneficial. Photographs taken over the years are a valuable aid in tracing campus evolution. College and local

Step	Goal	Activity
Identification	Survey	Conduct an Inventory of potential historic properties owned by or which may be acquired.
	If these properties exist:	
Procedural	Plan	Prepare a preservation guideline that accommodates institutional goals and assesses potential benefits/consequences. The plan should include factors related to campus area expansion.
	Nominate	Prepare an appropriate nomination of eligible owned properties to the National Register of Historic Places.
Implementation	Preserve	Undertake conscious efforts to maintain campus historic elements.
	Repair and Rehab.	Invest in keeping historic properties in good condition and guarantee future vitality as productive facilities.

Figure 1. Campus management historic preservation process.

newspapers can be a good source for identifying missing dates and details of events. Contact with alumni, or in some cases with surviving relatives, also may be a source of information.

In conjunction with "archival and oral history" research, onsite inspection of potential properties is necessary. Often such inspections will discover elements that may require additional research, such as dates of work, and names of involved architects and contractors. At a minimum, physical inspection of properties should describe and detail the condition and integrity of the following:

- Roof coverings
- Roof structure
- Foundations
- Electrical and plumbing systems
- Windows
- Other exterior features, such as entrances, porches, stairs, and lighting
- Bearing walls
- Heating, ventilation, and air-conditioning systems
- Interior features, such as floors, stairs, wainscotting, doors, base-chimneys, boards, ceilings, and lighting

Architectural design and features should be identified, along with an appraisal of distinctive characteristics which may exemplify stylistic trends or craftsmanship. The reversibility of modifications made over time also should be assessed. Likewise, surrounding grounds should be inspected for historic elements. Original street and sidewalk layouts, existing walls, street lights, landscaping, and mature vegetation types may be appropriate in this type of analysis. It also is recommended that the area be examined for any evidence of historic or prehistoric archeology.

Occasionally, some lost historic element may be rediscovered through inspection and research. For example, while conducting a survey at his institution, the author came across a large elm tree and beneath it stood a deteriorated cement block where once a plaque was mounted. After considerable research, the elm was identified as a rare direct descendant of the American Elm under which George Washington assumed command of the Continental Army in 1775. The possibility of finding a living tie to the American Revolution seemed at least remote when the survey began at this southwestern university which, in George Washington's time, was located on land thought to be owned by Spain. The state's Daughters of the American Revolution organization, which had originally donated the elm and the missing bronze plaque in the early 1930s, was notified and soon thereafter ceremoniously replaced the plaque.

If a likelihood exists that campus expansion may extend into other developed areas, the survey should identify and describe historic properties within these areas. The significance of potentially historic properties should also be ascertained. Much of this material may already exist in other already prepared local surveys.

Plan

A preservation plan that sits on a shelf gathering dust or is rarely referenced is of little use. If the plan is developed by preservationists who are not made aware of other planning activities and long-term institutional goals, this may be its fate.

Uniformity in preservation and in campus-wide planning is essential to the meaningfulness of both processes. In addition to gaining information from planning documents, those preparing the preservation plan should be encouraged to discuss campus-wide planning and goal setting with facilities personnel and executive management. Only if these persons hold an informed perspective of the college's direction can a preservation plan be appropriately integrated into master planning. With this larger perspective in mind, the preservation plan be appropriately integrated into master planning. With this larger perspective in mind, the preservation plan should outline and elaborate on standards, procedures, and considerations to be taken into account, including the following:

1. Identification of historic elements, with a detailed discussion of proposed actions to be taken or not taken to maintain the integrity of each element (e.g., the repair of original windows rather than replacement).
2. An integrity rating of the elements. Those with excellent-to-good integrity should be earmarked for preservation.
3. A priority rating of the elements. Those with urgent-to-high priority should be noted for consideration in campus maintenance or improvement funding.
4. Adaptive use analysis, including assessment of health, safety, fire, and handicapped access codes relative to current and potential uses. Examination of the advantages and disadvantages of various occupancies.
5. Documentation of historic landscaping.
6. The degree of existing infill construction. Assessment of potential low-impact and high-impact areas for future infill construction.
7. The influence of vehicle parking on historic qualities.
8. The influence of street lighting and signage on historic qualities.
9. Energy conservation, including assessment of the impact of retrofits on historic elements.
10. Any other technical conservation issues particular to a specific institution.

Drafts of the plan should be reviewed and commented on by facilities management personnel. These comments and follow-up discussions should be strongly considered in the final planning document. This step is fundamental to involving those who know these facilities best and to avoid potential alienation to the process of those who will be largely responsible for implementation of the plan. At intervals, executive management should be apprised of progress made and notified of any issues that potentially may need to be dealt with at the institutional level.

The preservation plan should be in such detail as to allow reference and guidance to facilities management personnel dealing with specific projects. Enough copies of the plan should be printed for ready access by all those involved in facilities management, planning, and maintenance, including physical plant crews. Encouraging use can avoid regrettable action by those working closest to these properties. One copy in the president's office does little good in day-to-day campus operations.

Before considering the initial preservation plan complete, the preparers should work with facilities management on establishing a process for implementation. Briefing executives of the key features of the plan and summarizing situational issues can help guide the implementation objectives that involve several departments or organizational areas. Associated activities could include preservation workshops for facilities personnel, adoption of detailed repair and rehabilitation procedures and standards, establishing review boards for project proposals, and hiring a historic preservation officer to further oversee general implementation.

Increasing public and campus awareness of historic properties also can aid implementation. News release, historic photo exhibits, lectures, and

heritage days not only garner appreciation and respectful treatment by occupants and visitors, these activities may also be an effective means of producing volunteers and monetary donations for preservation projects.

Other related campus-planning guides and master-planning activities should reference and incorporate key areas of the preservation plan. As needed, those responsible for preparing the preservation plan, or other consultants, should be contacted for information that may be of use in other areas of planning. At least every seven years, the preservation plan should be revised both to update inventories which take into account projects and events that may have changed the integrity of historic elements and to expand discussions of the status of currently related issues.

Nominate

The National Register of Historic Places was created by the National Historic Preservation Act of 1966, 80 Stat. 915, 16 U.S.C. 470 et seq., as amended. The act authorizes the Secretary of the Interior "to expand and maintain a National Register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering and culture" (36 CFR 60). Listing on the National Register of Historic Places is an official and prestigious recognition of the historic value of a property. For colleges, a National Register listing is a public testimonial to the institution's historical contribution. Such status can further fund-raising opportunities for preservation purposes; the private sector also may benefit from tax incentives.

Eligibility for listing a property on the National Register is assessed by the possession "of integrity of location, design, setting, materials, workmanship, feeling, and association." Properties listed are those

1. that are associated with events that have made a significant contribution to the broad patterns of our history; or
2. that are associated with the lives of persons significant in our past; or
3. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess higher artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. that have yielded, or may be likely to yield, information important to pre-history or history (36 CFR 60).

The criteria further specify that ordinarily

> cemeteries, birthplace, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past fifty years shall not be considered eligible for the National Register (National Park Service, 1984).

Each state has appointed a historic preservation officer (SHPO) to nominate properties to the National Register. This official coordinates the process by advising on eligibility and ensuring that the nomination is acceptable. Nominations are typically prepared by preservation consultants, historians, architects, or, in some instances, archeologists. Many colleges have used internal expertise for this purpose.

Often, community historical societies and commissions may prepare or support the preparation of a nomination within local areas. These organizations have sometimes included college buildings in their nominations. College administrators have often had opportunity for influence; at other times, they have not. A college can find parts of its campus nominated by these organizations with little chance for input. Harvard University and Arizona State University, for example, initially objected after local historical commissions nominated some of their buildings to the National Register. Once nominated, a college will find it difficult to have its buildings excluded from further consideration.

Local and state statutes also may establish requirements for nominating eligible properties within their jurisdictions. For example, within Arizona, all state agencies are mandated to locate, inventory, and nominate potentially eligible properties (ARS 41-861 et seq.).

The SHPO serves as an experienced resource in the nomination process, in part, to provide technical advice and supply necessary forms and instructions. Often, SHPOs have available lists of known preservation consultants. SHPOs also conduct annual, matching grants-in-aid programs which can assist colleges in funding survey and planning activities.

Prepared nominations are typically reviewed and evaluated by the SHPO. Once a nomination is found to be sufficient, it is scheduled for a public hearing before the state's historic sites review committee. Property owners and elected officials are notified at least thirty days in advance that the potentially eligible properties will be considered at the public hearing (36 CFR 60). Members of this committee are designated by the SHPO and must consist of at least five persons. The majority of members must be professionals in preservation-related disciplines, such as history archeology (historic and prehistoric), architectural history, or architecture (National Park Service, 1984).

The actual operation of review boards varies from state to state, a deliberate decision to allow flexibility for states to adapt programs to meet diverse needs. A primary required activity of the review board is to examine and evaluate the nomination and supporting documentation. The review board can then determine whether the property meets the National Register criteria and recommend to the SHPO that it be nominated. This recommendation may or may not include comments. The review board may also suggest revisions or recommend that the nomination not proceed.

From this point, the SHPO considers the review board's recommendations, along with public comments. When satisfied that the nomination is in order, the SHPO signs it and officially nominates the property to the keeper

of the National Register at the National Park Service in Washington, D.C. The SHPO's decision may be appealed to the keeper. Once the nomination is received, the keeper has forty-five days in which to list the property, return the nomination to the SHPO for further information, or reject the nomination. If a property owner objects, the keeper may instead make an official determination of eligibility. The last step is notification of the owners by the SHPO that the property has been listed or determined to be eligible.

Listing on the National Register does not in itself mean that the owner is bound by law never to alter the property. However, recognition of historical significance carries an official opinion that preservation of integrity is in the public's best interest.

Colleges are encouraged to consult SHPO staff regarding any proposed alterations or modifications to National Register-listed properties and to those that may meet the eligibility criteria. States vary considerably in what colleges may be obligated to do in historic preservation. In some states, colleges may be mandated to allow the SHPO sufficient opportunity to provide written comments regarding proposed alterations. Additionally, some SHPOs submit annual reports to the state's governor on how well public colleges are treating historic properties. Some states are even more stringent. At a minimum, demolition of a property listed on the National Register may require consideration of alternative options forwarded by the SHPO and submission of detailed documentation of the property's historic elements for posterity before razing.

If federal funds are proposed for the alteration of a National Register-listed property, or a property eligible but unlisted, Section 106 of the National Historic Preservation Act must be adhered to. Colleges receiving substantial amounts of federal assistance, particularly, may fall under these regulations. The involved SHPO and the Advisory Council on Historic Preservation, an independent federal agency, coordinate the Section 106 compliance process. Facilities managers and planners concerned about this requirement are urged to consult their state's historic preservation officer and review *Section 106, Step by Step,* issued by the Advisory Council on Historic Preservation in October, 1986.

Preservation, Repair and Rehabilitation

Everyone has an opinion on the management of a historic building. A preservationist viewpoint would be "if it works, don't fix it." A preservation consultant would recommend, "If it works and it meets your needs in someway, don't change it much." A faculty member may argue, "Trying to function in the past year I have been here has been a nightmare. The windows leak, the floors squeak, and the acoustics are terrible." Another faculty member may interject, "I spent more of my last twenty years here than I did at home—I like it. I am comfortable—don't change a thing." An academic dean may insist that "I've already got a million-dollar grant to operate a microchip laboratory in this place. Now get the ball rolling." A college

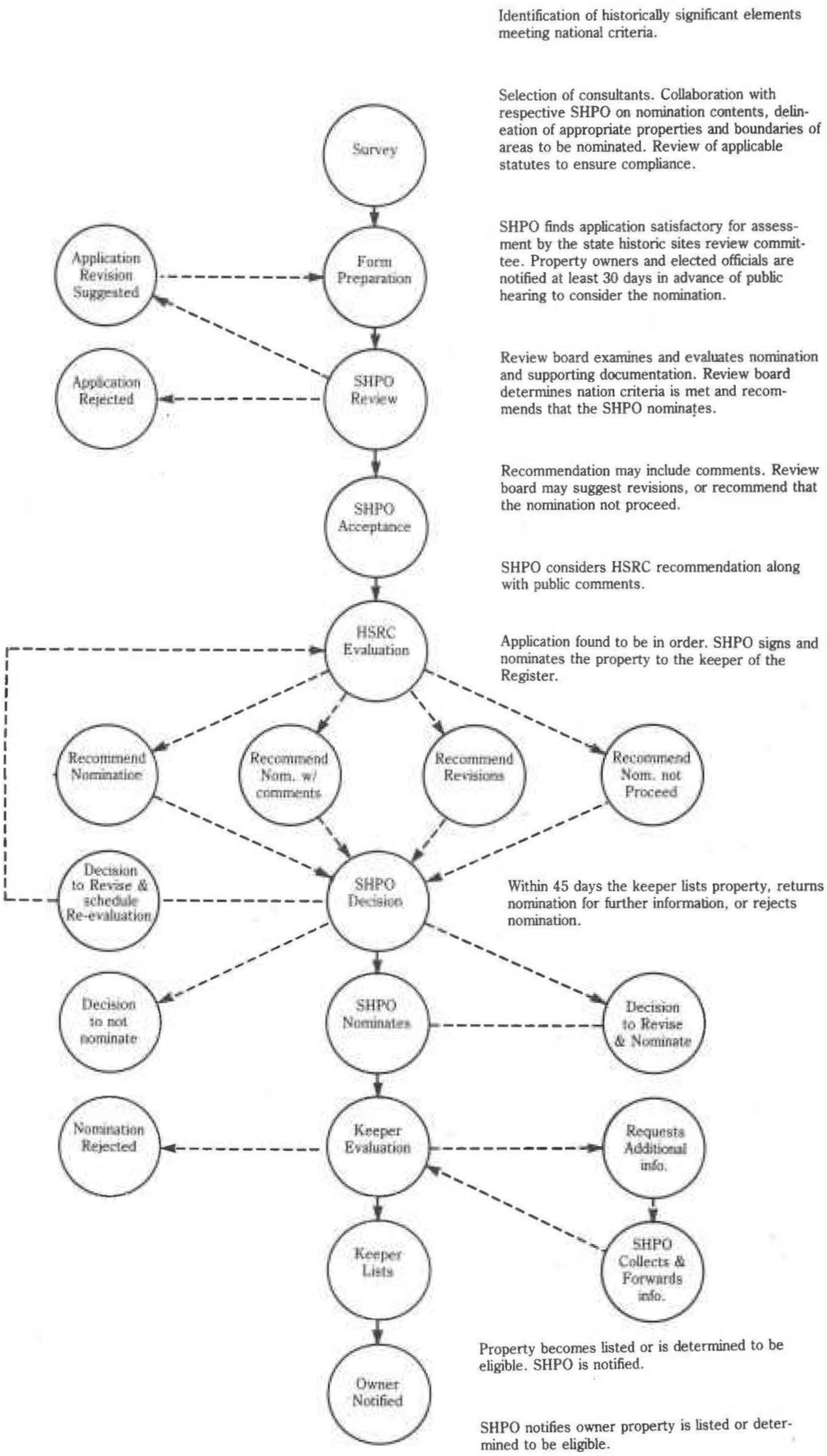


Figure 2. National Register nomination process summary.

president may worry, "How am I going to get $7 million from the board to renovate this place into something I can show and yet use when a new building in its place would cost $5 million?" An elderly alumna may remember, "My husband kissed me for the first time on the steps of that old building; it looks even more charming today than it did then."

In the practical world, renovating a historic building is only a matter of dollars and cents, more bang for the buck. Financial stringency facing institutions of higher education can easily translate into maximizing future productivity through dramatic alteration or razing. As mentioned previously, sole attention to this concern has already resulted in untold losses to the history of the American university and college architecture.

There are some professional campus planners who continue to insist that determination of the feasibility of renovating historic landmarks should reduce only to data elements and efficiency ratios (Sasken, 1987). Others acknowledge the importance of weighing other factors, such as preservation and unity of campus design (Kaiser, 1982). But regardless of the multitude of opinions, desires, and sentiments, and projected-cost scenarios, a college that wants to abide by accepted principles of preservation, and therefore maintain National Register status, must follow the *Secretary of the Interior's Standards for Rehabilitation* (36 CFR 60). Rehabilitation is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values" (National Park Service, 1983).

In 1977, the National Park Service developed the *Guidelines for Rehabilitating Historic Buildings*, which together with the *Secretary of the Interior's Standards* provides "a model process" for facilities managers to follow. These guidelines also contain a number of specific recommended and not-recommended treatments for historic properties.

Federal funds for restoring or renovating historic buildings are not available in the amounts of a decade ago. Since then, "brick and mortar" assistance has been sought by turning to private contributors. One result has been that gaining National Register status and the ensuing public recognition has become a more important factor in fundraising. Currently, Congress is considering the American Heritage Trust Act (HB 876), introduced by Representative Morris Udall. This pending legislation would once again earmark funding specifically for "brick and mortar" assistance. As mentioned earlier, each SHPO also operates a matching grant-in-aid program for survey and planning projects.

There are several federal programs which can presently assist rehabilitation of historic buildings but are not limited to this objective. The College Facilities Loan Programs operated by the U.S. Department of Education and the Community Development Block Grant program administered by the U.S. Department of Housing and Urban Development, are two examples.

Conclusion

It is generally conceded that American higher education works best when provided autonomy over its internal affairs. With regard to pursuing historic preservation, many would argue that institutions of higher learning ought to be the first in line to support this goal without interference. A number are, but some are not, although most are to a degree. Despite various legal statutes and appeals by historical societies, in the future, American colleges for the most part will continue to decide their own course of action.

The 1990s will be an era when American historic preservation will be dramatically influenced by the directions colleges undertake. The manner in which newly eligible properties for the National Register—and those already listed—are treated may portray to an unprecedented degree a lasting perception of the importance in providing a visible appreciation for history. Additionally, the manner in which campus expansion deals with historic neighborhood properties also will long be remembered by those in the college's home community and beyond.

At this time, the aggregate consequences of repeating the insensitive practices of the past are great. Will we as college managers and planners collectively act to save the remaining historic landmarks of American higher education? Will we act to acknowledge the historic value of campus properties which are not of the last century, but which may soon meet national criteria? Will we, as much as possible, consider and accommodate the history of nearby communities in deciding where and how campus growth occurs? Probably these challenges could not happen at a much worse time. Existing college facilities, both historic and nonhistoric, continue to deteriorate year after year due to lack of proper funding. The constraints of living within campus boundaries also may slow institutional progress and promise. The magnitude of these larger problems at an individual college can easily overshadow concerns about a few old buildings.

Undoubtedly, campus management and planning professionals will play a key role in trying to find the appropriate balance. The decisions made will be an important part of American collegiate history yet to be made. Let us hope that the record reflects our campus stewardships as a time that action was based on awareness. In both the short and long terms, that awareness of the importance of these irreplaceable vestiges of our past will prove to be in the best interest of the professional, the college, and historic preservation.

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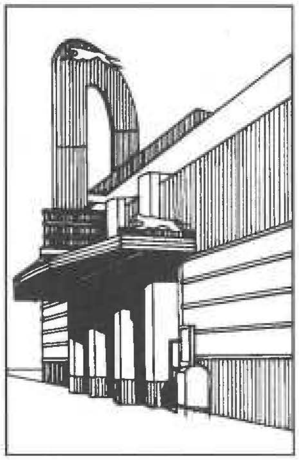
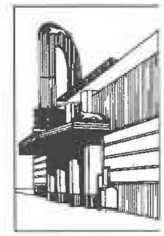
Conservation of Materials



Modern Materials Conservation: Issues, Theory, and Perspectives



Early Modern Architecture: How to Prolong a Limited Lifespan?

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In the nineteenth century, the building tradition underwent great changes. Traditionally, a few building types accommodated a variety of functions, and appeared quite easily adaptable for another use. Therefore, they had a long functional lifespan. The technical lifespan was in harmony with this practice. With the Industrial Revolution, the programmes for buildings became more diverse and specific, as did the buildings themselves. But since also the period of such a use changed, *time* and *transitoriness* ultimately became important issues in architecture.

Paired with the unparalleled technical progress of the era, these developments ultimately led to the revolutionary ideas and pioneering works produced by the designers of the Modern Movement. Around 1920, in Europe, they started to establish a *direct* link between the design, the technical lifespan of a building and user requirements.

Although considered normal practice today, this vision represented a revolutionary point of view in those days. Therefore, some of these works are high points of the cultural history of the twentieth century.

New Building

In the Netherlands, the consequent translation of these ideas into practice came to be known as "het Nieuwe Bouwen," a deliberate ambiguous notion that should be translated something like "New Building" rather than "New Architecture." Architect Jan Duiker was a main spokesman of this avant garde group.

Some famous examples of this architecture in Holland are the Van Nelle factories in Rotterdam (Brinkman and Van der Vlugt, 1925-29), the Gooiland Hotel in Hilversum (Duiker, 1934), and Duiker's Zonnestraal Sanatorium in Hilversum of 1926-28, erected by the

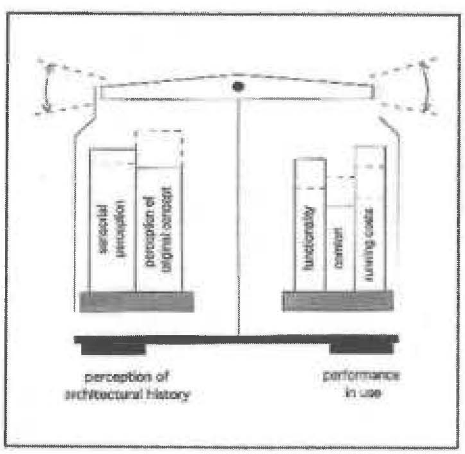
Zonnestraal Sanatorium (Duiker and Bijvoet, 1926-1928) in 1928; the "ship on the moors" near Hilversum, the Netherlands. (Photo: Eva Besnyo)

Diamondworkers' Union and now also a main monument of social history in our country, which I will use as an example to illustrate my points in this paper.

"Het Nieuwe Bouwen" was not referred to as a style or an aesthetic principle, but rather as a working method, a way of thinking about building. Duiker and his colleagues set great value on the connection between form, function, applied materials, economy and time. User requirements and economy were seen as the causes, while appearance and form emerged as a result. They regarded buildings as utilities with a limited lifespan by definition, sometime even as "throw away" articles.

Like Le Corbusier, Duiker loved to compare his works with automobiles and aircraft. While today it is quite apparent that Duiker's talents made him add a poetic dimension to his buildings, it is easily understood that he avoided addressing the aesthetic dimension of his architecture in most of his dissident publications and manifestos.

The rapid dissemination of these architectural ideas over the Western world suggested that an international style was born. While this idea inspired Hitchcock and Johnson in the early 1930s to their famous exhibition, Frank Lloyd Wright - and many after him - rightly called the concept of "an international style . . . a terrible nightmare."[1]



A key issue in any "modernist conservation" project is the balance between perception and use. (Drawing: Henket and DeJonge, 1990)

It is impossible to discuss the issue of "modernity" in architecture and urban planning, or its preservation, in such general terms. A diversity of approaches in modern architecture in different countries and regions should be recognized.

Modernity

Equally obvious, however, is that all these interpretations had a lot in common at the same time. The relation and contradiction between this "internationalism" and "regionalism" will be the central theme of the 1996 DOCOMOMO Conference in Bratislava.

Invited by ICOMOS to propose guidelines for inclusion of modern buildings in the World Heritage List, DOCOMOMO specialists are currently working on a set of criteria that will enable us to define more precisely what is the essence of modernity in architecture.[2]

At first sight, each of the key words that make up that complex palette of modernity seems to refer to a limited domain within it:

- such as collectiveness, mobility, leisure, recreation, health, hygiene, and sport, which are related to social change,
- or purity, asymmetry, dynamics, geometry, and the restrained use of colour, which reflect aesthetic ideals,
- or machine production, dry assemblage, standardization, and prefabrication, which all refer to technological progress.

Of course, there is an overlap: machine production advanced cheap construction which enabled rents to stay low, so that people could limit working hours, and enjoy sports and recreation.

Also, if the intrinsic meaning is more closely examined, some notions appear to represent a more general principle of modernity that relates almost equally to each of the three above domains, like clarity, economy, equality, progress, experiment, radicality, and change.

When thinking about preservation we might concentrate on the domain of technology. A few quotations from a recent reference work concerning the preservation of modern architecture, John Allan's "modernist conservation" chapter in the new edition of *Building Maintenance & Preservation*, will serve as a guideline.

The slenderness of the concrete frame resulted from the design principle of "spiritual economy." Today, the structure suffers from extereme deterioration. (Photo: Peter Bak)

Spiritual Economy

> A key theme in the origins and development of modernism was the determination to address contemporary social needs by exploiting new materials and constructional techniques. Indeed, the new aesthetics of modern architecture, derived partly from the artistic discoveries of Cubism and Purism, partly from the imagery of ocean liners, cars and aircraft, was greatly influenced by an idealized role for technology that, at least in the early period, was often well in advance of the realities of building construction. (Allan)

Most early modern buildings reflect a desire to create a clearly comprehended structure both in terms of construction and functional/spatial organisation.

The sanatorium buildings on the Zonnestraal premises are based on a 1.5 meter grid, which is approximately five feet. Floor slabs span 3 meters (10 feet) girder to girder, with a 1.5 meter cantilever at both sides. The area between the girders is divided into small patient rooms, that are virtually cubes of 3 x 3 x 3 meters. The northern cantilever of the floor is the corridor, the southern one is the balcony. The superstructure of the pavilion is directly linked to functional demands, and thus a good illustration of Duiker's ideas about optimalisation and economy.

> The new freedoms sought in planning, daylighting and architectural expression relied on new frame techniques, larger window openings and sheer planar effects. The evolution of two-way spanning panel and slab structure liberated architects from the inhibiting constraints of traditional masonry load-bearing construction. (Allan)

Duiker followed out a rigorous distinction between loadbearing parts and infills. This allowed him to attune each component to its proper function, by making everything as "monofunctional" as possible.

The facade of the sanatorium is nothing more than a membrane of steel and glass, a curtain wall "avant la lettre." By pushing material properties to their limits, buildings were designed with an extreme sensitiveness concerning building physics, notably with respect to thermal aspects and condensation. Another Dutch example is the facade of the Van Nelle factories, also designed in 1926.

> In place of stone, brick and timber came the materials of the modern age - steel, glass and, above all, reinforced concrete. Combining the tensile strength of steel with the compressive strength of concrete, this formless, composite, cheap, and universal material promised almost limitless versatility. (Allan)

The lightest construction possible was sought after, with a minimum of material used. The dimensions of the concrete beams for Zonnestraal follow the moment diagram, and beams are haunched at their supports to take up the shear forces. The necessarily complicated carpentry was economic in a period with cheap labour.

This striving after optimal construction is referred to by Duiker as "spiritual economy" that, as he wrote in 1932, "leads to the ultimate construction, depending on the applied material, and develops towards the immaterial, the spiritual."[3]

He compared this with the construction of Medieval cathedrals, the bright composition of Bach's fugues and the "horrifying magnitude" of Einstein's theories.

> Although reinforced concrete was relatively familiar in the field of civil engineering, its usage in architectural design and by domestic building contractors was almost unknown in the early 1930s [in Britain: WJ]. While avant-garde architects . . . and innovative engineers . . . could demonstrate the architectural and structural potential of reinforced concrete it is clear that its long-term behaviour was not fully understood. (Allan)

To fill the narrow shuttering for the sanatorium's frame, the concrete was made more fluid with a considerable amount of water. As a result, the low compression strength, in some columns not even more than that of wet sand, and the porosity cause serious problems today.

Control calculations indicated that the frame of one of the pavilions has collapsed in theory, and is being supported by the light separations that, of course, were never meant to do so.

Steel windows were another major mass product development of the inter-war period. In Zonnestraal, ungalvanized steel framed windows are mounted between steel posts that are positioned at intervals of 1.5 meter. Their regular maintenance and painting was planned to be a part of the patients' therapy; another stunning example of how Duiker balanced lifespan, function and budget. Without any maintenance over the last twenty years, the windows are totally deteriorated today.

Related to the idea of varied lifespans, the use of prefabricated parts was another means to arrive at the goals of the Modern Movement, since it allowed the easy replacement of deteriorated parts. The prefab concrete parapet panels of the sanatorium are likely to be the first ones ever to be applied in Holland.

> The application of this technology to achieve the desired imagery of modernism produced one of the most consistent building 'vocabularies' in architectural history. Much of its visual impact depended upon the impression of lightness, thinness, whiteness and geometric purity attainable in fresh concrete. The rejection of traditional embellishment in the drive for formal clarity tended to lead to the omission of conventional details such as copings, sills, drips and overhangs, weathering falls and surface relief generally. (Allan)

Duiker's work does not excel in properly detailed construction. To have considered plaster and mesh as suitable construction for external walls may not simply be attributed to ignorance or to slender financial means. Research in the field of building history has proven that, in technological terms, some of these designers were quite well aware of what they were doing. Apparently, they accepted a limited

Interior of a cubic patients' room after abandonment of Zonnestraal ("Sunray") Concrete girders are haunched to follow the moment diagram. (Photo: Delft University of Technology)

The facades of the sanitorium are nothing more than a steel and glass membrane, closding off the concrete frame. (Photo: Delft University of Technology)

One of the pavilions in decay, 1984. (Photo: Delft University of Technology)

technical lifespan as an answer to limited *financial* means. Since tuberculosis was expected to be exterminated within about thirty years, Zonnestraal's *functional* lifespan was expected to be limited too.

The issue of transitoriness of Modern Movement architecture should therefore sometimes be understood as a part of a designer's approach. This should have a great impact on how to restore these buildings.

Conservation Approach
The pioneers of the Modern Movement considered a building's right to exist not to be determined by its history, but by its usefulness. If a building would lose its function some day, in their view it should either be fully adapted to a new use or be demolished. To them, the idea of preservation was totally irrelevant or even contrary to the conceptions of the Modern Movement as regards the use, time and form of its products. By deciding in favour of conservation of their buildings, we act against their principles at the same time.

But wasn't it Kafka who stated in his will that all of his manuscripts would be destroyed after his death - and aren't we glad his heirs did not?

Duiker made these remarks in a time when his ideas had yet to gain respect and in the faith that the whole world would be full of lucid jewels like his own sanatorium. Of course it makes no sense to use the provocative points of view of an emerging group of dissidents as a starting point for our attitude with respect to conservation of their built pamphlets, in *our* time. His dreams about a modern world turned out differently and the few magnificent experiments of the 1920s and 1930s are the only ones that we have. What counts now is the cultural impact of their works today and in the future.

Authenticity
In view of the specific architectural principles of modern architecture, restoration of such buildings, however, requires not only other techniques, like other buildings from the Industrial Age do, but also a totally new approach as compared to traditional conservation.

Similar to the way that the preservation of modern architecture presents particular problems in philosophical terms, the technical background of these pioneering buildings now poses special challenges to the conservationist. A practical problem is the poor material quality of many of such buildings. Modern buildings weather very inelegantly and, in contrast to most older structures, a "patina" on their concrete or steel envelope rarely suits them.

How to deal with buildings where the bare constructions themselves are vital in the original conceptions? How to restore them without the aspect of transitoriness being covered by advanced restoration technology for eternity, leaving an artificial memento behind?

> It is in the combination of minimalist aesthetic with young technologies, not to mention a degree of professional naivety, that lies the origin of many of early modern architecture's technical shortcomings.
> (Allan)

Obviously they lacked certain knowledge with respect to construction as compared to what we know today. But a more delicate problem for us is to find out what exactly was their knowledge and what was beyond that, before we will be able to decide whether replacement of certain components or systems is appropriate or not.

We should be aware that the experiments of the modern engineers and architects represent a historic value of their own. "Improvements" according to current standards will easily destroy not only the sometimes fragile original detailing, but might just as well wipe out valuable sources for the historiography of building technology.

On the other hand, one should avoid overestimating the absolute value of materials and constructions as applied to modern architecture.

In view of the temporariness of function, most building materials and constructions applied to modern structures are short-lived, so that the authenticity of materials is difficult to maintain.

One could successfully argue that indeed the very materials are not the essence, when speaking about an architectural idea that pursued industrial building methods and the assembly of machine-produced components. The authenticity of appearance, form, detail and space-in-time seems more important in this respect. Yet the quintessence of the Modern Movement remains the idea, the conceptual starting points of the original designer.

Strategy

For many it has been clear that Zonnestraal, as an important and early example of the Modern Movement in the world, should be preserved. Yet there has rarely been as much discussion about the preservation of a building as in this case. For thirty years the "ship on the moors" was at the mercy of the waves, stirred up by the outcries of the cultural lobby as well as the economic interests of the owner, and left out of control by an irresolute National Conservation Department. At the same time, the intentional limitation of the building's technical lifespan caused an ever advancing material decay, that seemed to leave no other destination than to sell the ship for scrap.

In order to regain control, the Netherlands Department for Conservation commissioned Professor Hubert-Jan Henket and me to perform extensive research on the technical possibilities for restoration of modern structures like Zonnestraal in general.[4] During our work that was carried out in the late 1980s at the Eindhoven University of Technology, we actually went beyond our brief by including not only technical properties, building physics and running costs, but by also balancing these with values of architectural history and the original design approach. This balance forms the background of a working method that, on the basis of a limited series of models, allows to determine an appropriate restoration approach by providing adequate information on each of the above group of items for each of these models. Zonnestraal was used as a guinea-pig, and later on the method was used in practice for several restoration cases in Holland.

A main problem for the restoration of the pavilions of Zonnestraal seems to be the disastrous technical condition of the concrete frame. In view of both the "spiritual" and the "financial" economy, the frame has been designed extremely light, with slabs that are twelve centimeters (less than five inches) thick at their supports and a mere eight centimeters (three inches) in the middle of spans and at the cantilevers' edges. One can easily imagine that there can hardly be any covering on the reinforcement in such cases. The carbonation reaches far beyond the reinforcing bar, and the corroding steel pushes off the concrete covering, if present in the first place.

If we concentrate on the structural problems, a first option for preservation would be the complete demolition of the pavilion, followed by a reconstruction exactly according to the dimensions of the slender original frame, by using advanced contemporary technology.

The appearance of that replica could match the original to the full extent, and would largely respect the original idea. But in the international guidelines for the World Heritage List, authenticity of materials is a prerequisite for a building's eligibility for inclusion. Yet, if this model would be selected, almost all materials would be renewed and Zonnestraal would no longer be accepted by UNESCO.

Another option is to repair and reinforce the frame, using current state-of-the-art technology. This way, the authenticity of materials seems to be respected to a much greater extent. But apart from the costs - in this case, repair appeared to be far more expensive than replacement - there

are some quite fundamental drawbacks with respect to the original idea.

If we follow this option for Zonnestraal, we will have to accept principal and visible changes in the appearance of the building, such as an increase of dimensions of beams and columns. So, what will remain of Duiker's conception of optimalisation?

Also, the unintended loadbearing function of the partitions brings about a conflict with Duiker's ideas about the distinction of loadbearing and dividing elements, and flexibility in the use of space in time will be frustrated. It seems that in this case, the authenticity of the idea, and even of form, space, detail and appearance, will be overruled by the demand for authenticity of materials. As a restoration architect, I would therefore prefer the first option.

A future for Zonnestraal?

Some years after our initial research, we used the same methodology for a feasibility study for reuse of Zonnestraal as a training centre for members of the main trade-union in Holland, a reuse that seemed close to the original function. Our research explained that some requirements made by the trade-union, like contemporary double glazing, did not match the original character of the building. Obvious efforts to balance such contradictory demands with the original appearance resulted in disproportionate investments. Although one could regret that the trade union therefore decided to cancel the project, it is better to come to such a conclusion in advance rather than halfway, when there is no way back and the disfigurement of such a masterpiece would have been inevitable.

Recently, a new initiative has been developed to establish a health care center on the premises that will make use of the original sanatorium as well as additional new buildings. This initiative obtained the support of the conservation authorities and Hubert-Jan Henket and I have been invited as architects for the project, the completion of which is estimated to take another four years.

Notes

[1] Frank Lloyd Wright, "To my Critics in the Land of the Danube and the Rhine," *de 8 en Opbouw* (1932): 177-184.

[2] The International Council for Monuments and Sites (ICOMOS) is a non-governmental organization and the professional advisor to UNESCO's World Heritage Committee. On the basis of a long term project (in progress) for an International Register of Modern Architecture, DOCOMOMO has been invited to develop guidelines for the inclusion of modern architecture and urban design in the World Heritage List.

[3] Jan Duiker, "Dr. Berlage en de "Nieuwe Zakelijkheid," *de 8 en Opbouw* (1932,): 43-51.

[4] More information in Wessel de Jonge, "Contemporary Requirements and the Conservation of Typical Technology of the Modern Movement," *DOCOMOMO Conference Proceedings, First International Conference* (Eindhoven, The Netherlands, 1990): 84-89.

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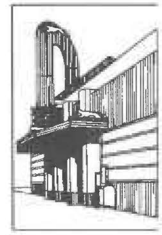

Conservation Issues for Modern Materials

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Introduction

Modern materials may be considered the hardest of all materials to care for in a collection, for several reasons. Changes are more apparent in modern materials, partly because we might remember their "new" state and compare, and partly because rapid change might be inherent to some of the more short-lived materials. We know little about long term properties of the materials, because we have no "antiques" to look to for comparison. And finally, modern objects often receive less care in a collection than more "classic" objects, causing them to deteriorate before their time.

This paper focuses on the most troublesome of the modern materials - plastics. Plastics is a broad term describing materials based on synthetic polymers. In the context of this paper, comments about plastics will be broadly applicable to all functional objects made from synthetic polymers, including textiles, coatings, rubber materials, as well as "classic plastics" (three-dimensional objects such as kitchen utensils, furniture, toys, knick-knacks, etc.).

Not only do plastic objects have a short history (giving us little experience to use in predicting lifetimes, especially in a museum collection) but they often have received little respect, being viewed as cheap replacements. However, it should be remembered that "synthetic polymers represent the first new materials adaptation in three thousand years"[1]. Additionally, "their development is inextricably entwined with that of humankind, and the different phases of their evolution reflect people's changing needs, desires and attitudes over the years."[2] Upon reflecting on these two aspects of plastics, the importance of conserving plastic objects from the recent past becomes apparent.

Plastics are difficult to preserve, both because they are often in a state of rapid deterioration, and because they can be sensitive to a variety of conditions: heat, light, moisture, solvents, cleaning agents, etc. Plastic objects in a historic building are especially at risk, as they are often "part" of the building, in the form of hardware (knobs, molding, fixtures), or they are still in use, and unprotected from adverse conditions.

In preserving plastics, the collections manager must first be armed with the knowledge of the chemical nature of the plastics in the collections in order to make informed decisions about care, cleaning, protection and display. This article provides basic information about the types of polymers and additives commonly found in plastics, plastics formation, and general precautions for care.

"Basic" Plastics Chemistry

In making decisions about plastics in a collection, some basic polymer chemistry is called into play. Some of the basics are: what are polymers; what affects their properties; what kinds of additives are typical; how are they processed? This section will address those questions and give the reader the basic facts necessary to make choices based on composition and processing.

Polymer Basics

Polymers are large molecules, often described as chains, with a characteristic unit acting as the links in the chain (Figure 1). The polymer is often named after this unit, called a repeat unit, and the repeat unit is often based on a small

molecule, or monomer, used as a starting material. The process of combining the monomers into a polymer is called polymerization, and it is a chemical linkage between the monomers.

The properties of the polymer depend on the chemical make-up of its repeat units, the number of repeat units per "chain" (indicated by the molecular weight), and the manner in which the units are linked. For example, a polymer can be acidic, basic, hydrophilic, or hydrophobic, depending on the nature of the repeat units, or more specifically, the functional groups on the repeat unit once it is polymerized. Polyester, for instance, is made with acidic monomers, but since the units link via the acid group, the acidic nature is destroyed, and the polymer itself is only weakly acidic.

When the repeat units are linked end-to-end, like train cars, the polymer is called "linear." If there are more than two linkages per unit, and the side links are short chains, it is referred to as "branched." If the side linkages are to another polymer chain, the polymer is "cross-linked" (Figure 2).

Most polymers form amorphous solids; they do not solidify into crystals as do some other chemicals, such as salts. This is due to a lack of order in the position of the chains relative to each other. However, if the chains can fit together in some sort of regular, packed pattern, the polymer will be at least partially crystalline (Figure 3).

Polymer Properties

Polymers have specific properties, which depend on temperature, and are divided up into two categories based on those properties: those that can be melted and reshaped, or "thermoplastic," and those that harden or set with heating, or "thermoset." Thermoset polymers cannot be remelted after they set, whereas thermoplastic polymers can be repeatedly remelted and remolded. Most polymers have several temperature-dependant states that affect their properties: glassy at low temperatures, leathery to rubbery in middle temperatures, and deformable (molten) at the highest temperatures. With the application of force at these temperatures, the typical polymer would snap, bend or flow, respectively.

The temperature at which a polymer changes from glassy to rubbery is called the glass transition temperature (T_g). The temperature at which it can be deformed is called the softening temperature, and the temperature at which it

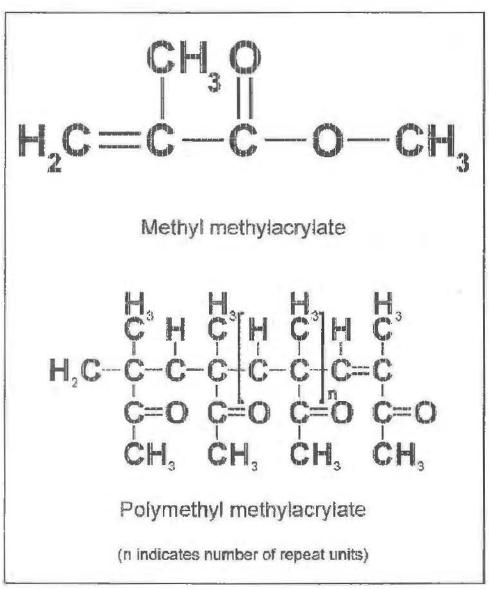

Figure 1: Methyl methacrylate monomer and polymer.

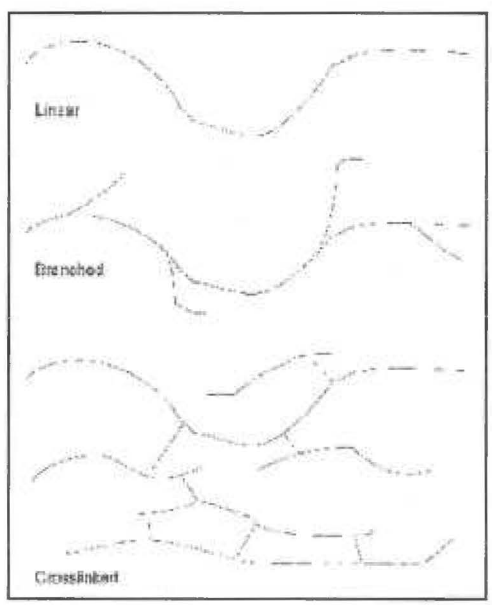

Figure 2: Representations of linear, branched, and crosslinked polymer chains.

flows like a liquid is the melting temperature (T_m). Softening and melting temperatures are often close or the same for a polymer.

The response of a polymer to force is dependant not only on temperature, but on the time period of application. A rubbery polymer will shatter like a glass if force is applied very rapidly, as with a sharp blow, and will eventually deform and flow if it is exposed to low amounts of stress for long periods of time.

Most linear polymers can be dissolved in at least one solvent. In solution, the polymers keep their chain configuration, but the chain becomes very flexible. Small amounts of solvent can have a softening effect similar to that caused by heating, and indeed the glass transition and melting/softening point are generally lower in a solvent-swelled polymer. This is important to remember, as the polymer chains might set in one configuration during processing, in order to produce a desired property, and exposure to heat or solvents will allow the chains to move and settle into a different configuration.

An example of the similar effects of temperature and solvent on a polymer can be seen in "heat shrink" tubing, used on wires and pipes. The tubing is made by stretching the plastic as it is cooling, forcing the polymer chains to be abnormally extended. Heating the polymer to the point where the chains become more mobile will cause them to relax back to the unstretched, shrunken state; exposure to the right solvent will have a similar effect.

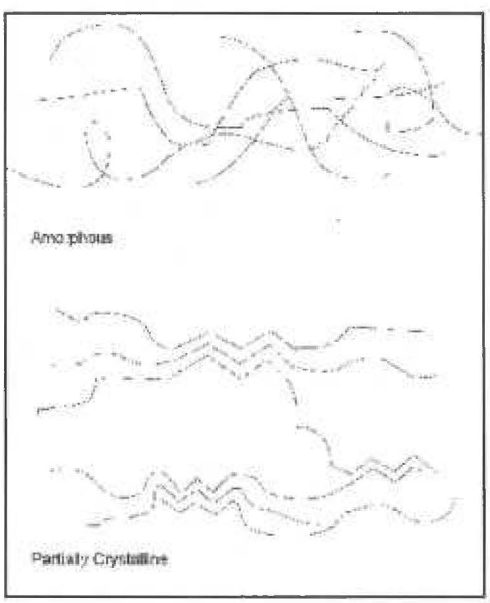

Figure 3: *Representations of amorphous and partially crystalline poylymers.*

Crosslinked polymers generally cannot be dissolved, but can be "swelled" with solvents. Once again, the solvents will have the same effect as adding heat; the crosslinked polymer will become softer and may deform.

Overview of Polymers

Manufacturers tend to be vague about how they make their plastics; this is usually due to a desire to keep a process proprietary, but also is due to a desire to avoid overloading the consumer with information. Many manufacturers will discuss, in general terms, many details of the formulation and processing of a plastic if they feel that the consumer truly needs the information and is able to understand it. In addition, the formulations of "historic" plastics might be described in trade literature of the time, or in company records.

It is therefore useful to be familiar with the generic and chemical names of polymers commonly used. In addition, while a finished plastic is rarely made of only one polymer, it is useful to know the relative properties and stabilities of the pure polymers.

What follows is a summary of polymers that are commonly found in most plastic sheets, films, parts, foams and coatings. They are grouped and discussed by chemical class.

Polyolefins

Polymers having only carbon and hydrogen are called polyolefins. Their properties are defined by their molecular weight, the number and type of side chains, whether they are crosslinked or not, and whether they are saturated (only single bonds) or unsaturated (some double bonds).

Saturated Polyolefins The saturated polyolefins are known by their waxy feel and milky color. This group consists almost entirely of polyethylene, polypropylene, or mixtures of the two. The saturated polyolefins are thermoplastic; however, they can be crosslinked (usually with a peroxide), making them thermosetting.

Polyethylene is available as low density (LDPE) or high density (HDPE). Polyethylene is sensitive to ultraviolet light and susceptible to oxidation and must therefore be compounded

with stabilizers, such as antioxidants and radical scavengers, or with stabilizing fillers, such as carbon black.

Polypropylene is more susceptible to degradation by ultraviolet light and oxygen, and therefore is more likely to need stabilizers. The milky appearance can be reduced by stretching the soft, molten polymer during processing into sheets; the resultant orientation of the polymer chains results in a clearer sheet.

Ethylene/Propylene Copolymers are less brittle than either homopolymer. A small amount of ethylene in the copolymer merely gives it better flex and low temperature properties. Compositions with higher amounts of ethylene are referred to as EPMs, and are rubbery, but still thermoplastic.

Low-temperature Polypropylene is not a different polymer, but instead is a blend of polypropylene with natural or synthetic elastomers. The elastomers help toughen the plastic by damping crack propagation; this helps prevent the plastic from shattering when flexed at lower temperatures.

Unsaturated Polyolefins Dicyclopentadiene is copolymerized with ethylene and propylene to make a rubbery material similar to EPM, referred to as EPDM, with double bonds that will react during vulcanization (generally with a peroxide) to form a crosslinked elastomer.

Butyl Rubber consists of isobutylene copolymerized with isoprene (either synthetic or natural, as rubber latex). Isoprene can also be chlorinated, which produces a vinyl-like material, called Chlorinated Rubber. Isoprene, in the form of natural rubber, is often vulcanized slightly (crosslinked by heat and sulfur) to make an elastomer. More highly vulcanized rubber is known as Ebonite or Vulcanite, and is quite hard.

All of the unsaturated polyolefins are susceptible to oxidation, with the elastomers becoming brittle and cracked. Highly vulcanized rubber can lose sulfur as it degrades, and become soft.

Vinyl Polymers
The term "vinyl" refers to the starting monomers, and not to the end properties of the material. Their structure is similar to polyethylene except that they have a strong, electronegative group (such as chlorine or fluorine) attached to the chain on every other carbon (the vinylidene polymers have two of these groups attached to every other carbon). The resultant polymers are hard, brittle, and very sensitive to heat and light degradation.

All the polymers in this group are either unplasticized and brittle (making them difficult to work) or plasticized and flexible (making them more likely to degrade or exude additives). The plasticizers used in vinyls are notorious for migrating out and collecting on the surface of the plastic in droplets, attracting dirt and causing damage to nearby artifacts.

The degradation products of the vinyl halide or vinylidene halide polymers are very reactive, being either hydrochloric acid or hydrofluoric acid. The degradation product of polystyrene is styrene monomer, which is a strong solvent for many resins.

Polystyrene is the common name for polyvinyl benzene. Although it is never plasticized, it is often blended with butadiene rubber to increase its impact resistance. The blend is translucent, and becomes opaque white when stressed. Styrene can also be copolymerized with butadiene to obtain styrene-butadiene rubber (SBR), or with butadiene and acrylonitrile to form ABS, which is very hard, but less brittle than pure polystyrene.

Polyvinyl chloride (PVC) is also very brittle in its pure state, but can be plasticized with thirty to eighty percent plasticizer to make a rubbery material. It can also be dispersed as spheres in liquid plasticizer. This composition is used to make rubbery coatings as well as some molded pieces.

Polyvinylidene chloride (PVDC) is slightly more stable to elevated temperatures than polyvinyl chloride. Often, the two are copolymerized to make PVDC/PVC. Both the homopolymer and copolymer are brittle, or can be highly plasticized to make them rubbery.

Polyvinylidene fluoride is stable at very high temperatures. It can also be plasticized like PVC and PVDC, but requires very stable plasticizers for very high temperature applications.

Vinyl Acetate Polymers
Polyvinyl acetate (PVAC), polyvinyl alcohol (PVAL), and polyvinyl acetal are all made with vinyl acetate as the starting monomer. After the monomer is polymerized to make PVAC, further reactions replace the acetate group with an alcohol, yielding PVAL. A reaction of the alcohol group with an aldehyde yields polyvinyl

acetal. PVAL contains varying amounts of vinyl acetate groups, and polyvinyl acetals contain both vinylacetate and vinyl alcohol groups. Deterioration of these materials can produce acetic acid, which will off gas, especially if the polymer was used as a water-born dispersion. These materials have good ultraviolet light and heat stability, but poor resistance to polar solvents.

Acrylate and Methacrylate Polymers
This group, generally referred to as acrylics, yields characteristically clear plastics that can range from very soft to highly brittle and from polar to non-polar, all without the use of additives. The range of acrylate and methacrylate monomers and the manageability of their polymerization allows the producer to make a copolymer or terpolymer with a desired set of qualities.

The acrylics are very stable, although some tend to crosslink slowly, and do not yellow, unless they have been made with unsaturated side chains. When subjected to sufficiently high temperatures, many degrade by depolymerizing, releasing monomer.

These materials do not require plasticizers and antioxidants, and so instability due to additives is not a problem. However, their polymerization and processing methods can affect their stability. Incomplete polymerization will cause residual monomer to be present in the plastic, which will off gas and cause shrinking and cracking in the plastic. Similarly, solvents added during polymerization or processing, generally to lower the cost of the resin by diluting it, but sometimes used to aid processing, will also off gas. There is generally an inverse relationship between the cost of acrylic resin and its residual monomer and solvent content.

Polycarbonates
The majority of these polymers are formed from Bisphenol A and phosgene; variations are generally in the form of adding other functional groups, such as bromine, to the rings of the Bisphenol A. The resins are transparent and tough, with high impact strength and heat and flame resistance.

Polyesters
The name "polyester" describes the ester link formed between the monomers during polymerization, and is not specific to the monomers themselves. Polyesters are grouped into the following: saturated, unsaturated, and alkyds.

Saturated Polyesters The two main saturated polyesters are polyethylene terephthalate (PET) and polybutylene terephthalate (PBT). They are made from an alkyl terephthalate and an alkyl glycol. They are clear, tough, and have a high dimensional stability. The polymer chains are easily oriented by stretching in the molten state, making these materials very useful as films, fibers and containers. Although they are thermoplastic, their high melting point makes it difficult to mold them into large, massy parts. These polymers are very resistant to thermal degradation, and have good resistance to cold solvents and weak acids.

A polyester elastomer is also produced from copolymerizing an alkyl terephthalate monomer with a small chain length polyether glycol. These polyester elastomers are thermoplastic and very stable, being similar to PET and PBT in chemistry.

Unsaturated Polyesters Unsaturated polyesters are formulations made specifically for laminating or casting, and are usually provided in two parts: 1) a viscous mixture of small chain polymers of phthalic acids, unsaturated dicarboxylic acids (such as maleic acid) and a glycol, all dissolved in styrene monomer; 2) a peroxide initiator, often dissolved in a dialkyl phthalate. When mixed together, the initiator produces radicals that cause crosslinking between the unsaturated portion of the polymer, as well as polymerization and incorporation of styrene.

These polyesters are generally filled with glass fiber or cloth, and referred to under the generic name of fiberglass. The polymer itself is stable, but the amounts of starting materials remaining is highly dependent on the processing method. Commercially produced fiberglass pieces are generally cured at high temperatures, ensuring complete reaction of the initiator and the evaporation of any residual styrene. Room temperature casting and fiberglass patch kits generally have high amounts of residual peroxide initiator and styrene monomer.

Alkyds Alkyds are specific polyesters, made from a phthalic acid or anhydride, a glycol, and an unsaturated fatty acid. They are mostly used for coatings, and become crosslinked by the action of oxygen on the double bonds in the fatty acid portions. This process is similar to the way oils such as linseed oil dry, and like the oils, an alkyd might have a metallic (usually lead-based) "dryer" added to accelerate the crosslinking. They are stable, but are subject to yellowing.

Polyurethanes
Formed from diisocyanates and alcohols (glycols and polyols), polyurethanes can be either linear or three-dimensional polymers, depending on the type and amounts of starting components. Linear polyurethanes, formed by using a glycol as the alcohol monomer, are used in fibers. Three-dimensional polyurethanes are made either by using an excess of diisocyanate or by using a polyol, such as glycerol, to allow the chain to branch as it grows. The three-dimensional polyurethanes are used to make rigid foams or coatings.

Both the linear and the three-dimensional polyurethanes can be made using a flexible polymeric glycol or polyol; the result is an elastic fiber in the case of the linear polyurethane, and a soft foam or rubber in the case of the three-dimensional polyurethane.

The stability of these elastomeric polyurethanes is dependant on the flexible polymeric glycol or polyol used. If a polyether alcohol, the resultant polyurethane has good resistance to light, moisture and oxidative degradation. These polyether polyurethanes are considered reasonably stable. However, the polyurethane products made with a polyester alcohol have superior mechanical properties, such as better shock absorbance and a lower tendency to crystallize. Unfortunately, these polyester polyurethanes are more prone to degradation from exposure to light, moisture and air, and may turn brown and sticky.

Formaldehyde Resins
The three main resins made from formaldehyde are Phenol formaldehyde (originally marketed as Bakelite), Urea formaldehyde, and Melamine formaldehyde. These are thermosetting resins that are generally only seen as premolded, filled pieces, or as laminates. (An exception is Urea formaldehyde foam, which was used as blown-in insulation for houses, and crosslinked on-site.)

The resins are all resistant to flame and acids, and have good resistance to most solvents. Melamine formaldehyde resins are less likely to yellow than the other two.

Degradation of these resins is highly dependant on processing; they are first made as water-soluble oligomers, and then crosslinked by either heat and/or acid catalysis. Residual acid catalyst will eventually cause depolymerization and the release of formaldehyde. Many laminate manufacturers use a heat-only process, which avoids this problem. However, most laminates may still have residual starting materials, and can let off gas for several months after production.

Epoxies
Epoxy resins are made from a dimer or oligomer that has at least one glycidyl ether end group. The epoxy is cured by the addition of an amine- or amide-containing molecule, for low-temperature curing, or an acid anhydride, for high-temperature curing. These materials are referred to as the hardener. The chemical composition of the epoxy then depends on the make-up of the two components and can range from saturated chains to polyethylene glycols to aromatic esters.

In general, the high-temperature cured epoxies are stable, although they can be susceptible to yellowing, particularly those containing aromatic groups. The room-temperature polyamide-hardened epoxies are generally found in commercial two-part adhesive kits, and do not form stable polymers. For the amine-hardened epoxies, the stability depends greatly on the excess hardener left in the resin.

Epoxy resins are not soluble but can be swelled with many solvents. Depending on the composition, they can have either good or poor resistance to degradation by light and oxygen, although epoxies will tend to slowly oxidize and yellow with age.

Polyamides and Polyimides
Polyamides are made from the reaction of a diamine and a dicarboxylic acid; the aliphatic, linear polyamides are known as nylons. A polyamide made with an aromatic diamine is know as an aramid. Polyimides are made from the reaction of a diamine and an anhydride.

These materials are technically thermoplastic; however, many have melting points that are higher than their degradation temperatures in air, so they are not used in applications that require melting. Instead, they are generally polymerized as they are formed.

Polyamides and polyimides are characteristically insoluble in anything but strong acids. They are resistant to oxidation, but can degrade upon prolonged exposure to light or moisture.

"Natural Derivatives"
Plastics derived from natural sources include the cellulose derivatives (cellulose acetate, cellulose

nitrate) and the protein plastics (casein, albumin). The cellulose derivatives are made by an acid process, and will release these acids as they degrade, causing further, autocatalytic, degradation. In addition, cellulose nitrate is often plasticized with volatile materials, such as camphor, which eventually evaporate, leaving the plastic distorted and brittle. The proteins are often cured with formaldehyde, which is released as they degrade, causing softening. All of these materials can be water sensitive, and the cellulose derivatives are very soluble in common alcohols, found in beverages and cleaning agents. Other natural products include shellac, horn and tortoise shell, which can be pressed under heat and formed. These products are heat sensitive, and shellac (and other natural resins) is soluble in alcohol.

Additives

Many of the problems associated with plastics are caused by the additives, not the polymers. Additives are materials that are mixed with the polymer during processing steps, either for improving processing ease, or for manipulating the final properties of the plastic. Most additives are small molecules (compared to a polymer) and therefore are usually more mobile and more likely to migrate and cause physical changes in the plastic upon exposure to heat or solvents.

Additives are generally grouped according to their function, rather than by chemical properties, although it is usually true that additives that are chemically similar will have similar functions. The four groups of additives of greatest concern in museum collections are antioxidants/stabilizers, plasticizers, foamants, and fillers.

Antioxidants/Stabilizers

Almost all plastics will have some type of stabilizer in them; even if the polymer is resistant to oxidation in normal use, the stabilizer will be added to minimize degradation due to the higher temperatures of processing. Many stabilizers, especially those in plastics made between 1940 and the 1980s, can change color upon oxidizing. Also, except in plastics made in the last decade (with improved, self-regenerating stabilizers), the stabilizers will eventually be exhausted, causing a previously stable-seeming plastic to suddenly begin to oxidize at an accelerated rate.

Plasticizers

The most common plasticizers, the dialkyl phthalates, are oily, and can migrate over time to the plastic's surface and attract dirt and dust. Many plasticizers are effective solvents for synthetic and natural resins and can cause undesired softening in these materials. The plasticizers can also cause corrosion of metal parts. Therefore, a plasticized object can be a threat to other objects, or even to its own parts, if a composite.

The single most plasticized polymer is Polyvinyl chloride. A PVC plastic can contain up to 70 percent plasticizer. Plasticizer loss will result in stiffness, cracking and shrinking. The loss can be accelerated by exposure to solvents or heat.

Foamants

In order to create the air bubbles in foamed materials, the manufacturers must include a material that will produce a gas during processing. The most inert of the foamants are the ones that are gasses at room temperature, such as nitrogen, carbon dioxide and chlorinated fluorocarbons. These also tend to dissipate quickly, and are not found in the finished foam. Low-boiling solvents, which become vapor during processing, dissipate more slowly, and can often be detected in newly made foams. Chemical foamants are materials that react when mixed or heated to produce a gas (similar to the production of carbon dioxide when vinegar and sodium bicarbonate are mixed). These often produce reactive by-products, such as strong acids, which can be detected long after production.

Fillers

Polymers are generally filled to make them stronger, lighter, and to cut costs. A filler can be either inert or chemically active. The inert fillers include mineral fibers (such as asbestos), glass fiber or beads, clay, etc. The active fillers include wood flour (and other ground plant material), calcium carbonate, carbon fibers or powder, etc. Plant-based fillers tend to make an object very sensitive to oxidation from light or heat, and often can be moisture sensitive as well.

Formation

The various methods of forming plastics are too numerous to detail here, but they all have one thing in common: the material must be in liquid form, or at least soft, in order to be formed (except for methods involving cutting or grinding). In some cases, this is accomplished by assembling the monomers (or oligomers - partially polymerized polymers) in the mold and initiating polymerization by chemical or thermal

means. Polymers can also be dissolved and cast as sheets or in a mold. They can be melted and extruded into a shape or injected into a mold, or they can be softened by heat and pressed into a form (or blown with air). They can also be cut or ground from stock pieces.

It can be essential to know the formation process of a piece in order to know what problems to expect. For example, plastics formed by heat-softening and pressing/blowing tend to have frozen-in stress; this stress can be released upon exposure to heat or solvents, causing the object to warp. Plastics that were formed by cutting from stock might have inherent crack tendencies near the cut edges, which can become apparent under stress.

Recommendations

A lot of plastics care lies in prevention. Keeping a collection from strong light (daylight or fluorescent), high temperatures, large/fast changes in temperature or humidity, pollutants, and air (when possible) will help to prevent premature deterioration.

Cleaning of plastics with anything other than a dry (or slightly damp, if the plastic is not moisture sensitive) soft cloth is discouraged. Cleaning solutions contain solvents and alkaline components, such as ammonia, that can cause softening, distortion and/or chemical degradation. Polishes can also contain these materials, along with waxes (which can soften the plastic and attract dust) or silicone compounds (which can be almost impossible to remove).

For obvious reasons, abrasive cleaners are also not recommended. In addition to the danger of increased cracking, any surface evidence of formation method would be removed. Many plastics also had surface textures molded in, which would be ruined by an abrasive cleaner.

While the above recommendations will help prevent damage to a plastics collection, it is important to be aware of the specific polymers in a collection, so that any special problems inherent to certain polymers can be avoided or reduced. A survey by a conservator or conservation scientist (either in-house or external) can yield necessary information for efficient preservation of a collection.

Notes

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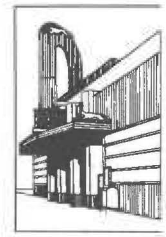

Replacement and Retention of Twentieth-century Materials in the Nation's Capital

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Introduction
The National Capital Region of the General Services Administration (GSA/NCR) has identified fifty-two historic properties of twentieth century construction amongst its federally-owned assets. These properties range from those designed and constructed through competition for the Federal Government, those designed and constructed by the Office of the Supervisory Architect of the Treasury, and those designed and constructed under the two major new construction programs of the twentieth century - the Roosevelt Administration's New Deal accomplishments, and the Kennedy Administration's legacy.

All of these properties were constructed with the intention of longevity, monumentality, and symbolic stability, which tended to guide the design architects towards selecting construction materials that had been proven to have testing and warranties behind them. (These documentation generated with each successive construction program now makes up the Public Buildings Service record group at the National Archives.) However, these fundamental attitudes do not insulate these properties from the problems faced when man-made materials need to be replicated. Unlike natural materials, which occasionally become extinct due to ecological changes, man-made materials' extinction may be caused by changes in taste, new technology, or bankruptcy, to name a few.

For the past twenty years, the Public Buildings Service of the GSA has attempted to maintain, repair and restore portions of these properties that require replication of their original materials. The pre-World War II buildings used predominantly natural materials, whereas the post-World War II buildings incorporated some of the new man-made technology.

Several obstacles stand in the way of man-made materials replication: 1) availability, 2) building construction code changes and Americans with Disabilities Act (ADA) compliance, and 3) contempt for "outdated" materials. Matching the twentieth-century man-made materials used in the Public Buildings Service portfolio has proven time after time to be a nearly impossible task.

Society's need for the latest, improved version of a product has caused the restoration of cork flooring in the Department of Commerce (1932) auditorium to be a difficult undertaking. At the Department of Interior (1935), the original innovative suspended ceiling lighting system has been superseded in the marketplace so many times that there is no product available with any semblance of the original design.

The US Courthouse (1952) elevators had a precursor of Formica used for the cab walls. It was real wood with a very hard plastic coating applied through a manufacturing process. The product had long gone out of production, but it was needed for car door replacement. And the cab flooring, a vinyl asbestos tile, also needed replacement. This same building's courtrooms' acoustical wall tile has become extinct, with many new technological changes designed into the replacement materials.

In the 1968 headquarters of the Department of Housing and Urban Development, designed by Marcel Breuer, a desire to "brighten up" the

cafeteria led the concessionaire to paint the architectural concrete. At the Hubert H. Humphrey Building (1974), another Breuer building, the Department of Health and Human Services tenants wanted to replace their original teak elevator cabs with Formica for ease of maintenance. And replication of an unusually colored blue-gray quarry tile for the roofing of the Bureau of Indian Affairs Building caused great color matching difficulty during fabrication.

The list of retention and replication issues for twentieth-century materials in the GSA National Capital Region is almost endless because our properties were predominantly built during this century and have an inordinate number of demands placed upon them as headquarters properties for the federal government. Several case studies illustrate how GSA/NCR deals with these complex issues.

US Courthouse

At the US Courthouse in Washington, DC, several man-made materials have needed replication. The building was designed and constructed between 1947-1952. In the words of its architect, Louis Justement of Washington, DC, "It is an example of contemporary trends relying on simplicity and architectural expression based on adaptation to function." The building's legislation authorized the design and construction of a new Federal Courthouse building for the US Court of Appeals and the US District Court of the District of Columbia Judicial Circuit - a joint DC/federally used building.

At the US Courthouse, it was decided that soiled and deteriorated wood fibrous acoustic wall tiles in each of the courtrooms in the building should be removed. It was important that the panels be replaced in a way that was both sensitive to the original design and would not compromise the courtrooms' acoustics. An acoustical consultant was engaged in the project to assure the replacement material's functionality.

There are twenty-one courtrooms in the building, divided into five types. All but one of these courtrooms have their original wood fibrous acoustic wall panels on their rear walls. These panels are 2 foot by 2 foot tectum panels applied with a mastic. The one courtroom that does not have tectum panels has an original fabric-covered fiberglass wall system on its rear wall. This wall system is panelized to recall the extant modular panel design of the wood side walls.

The original drawings of the US Courthouse indicate the architect's intention that all of the courtrooms were to receive a fabric-covered acoustic rear wall. Details and section cuts through each rear wall reference one detail that clearly indicates that a fabric-covered fiberglass panel be used. A wood batten grid with fabric covering that aligns with the wood paneling is the original design intent according to the extant drawings for the courtrooms.

It is unclear why the tectum panels were installed. They have good acoustic properties and are less expensive than fabric-covered fiberglass, but such cost savings would have been more logically located in less important spaces than the courtrooms. In addition, the tectum has become extremely soiled because of its tendency to act as a filter for the return air grille found in the center of each courtroom's rear wall.

A sample of the original fabric covering for the fiberglass panels found in one of the courtrooms was used for matching purposes. It has a non-directional diamond pattern and is champagne colored. A lack of natural light entering the courtrooms eliminated any problems of surface fading. Detailing of the new fabric-covered fiberglass panels followed that of the original design, applying the fabric in the field, but using 1993 technology.

Three stock fabrics were found to be close to the original in color and had uniform, overall subtle patterns, with a diamond shape emphasized but slightly more textural than the original material. Since judges always participate in finish selections for their spaces, a ranking of the fabrics was created and offered. Fourteen of the judges followed the first choice recommendation, and seven chose the new second choice fabric. Both fabrics share the champagne color and a uniform, overall pattern.

This process probably mimics some of the steps taken during the building's construction. However, this project held the judges within a tighter range of options, and thereby stayed closer to the original architect's design intent.

As early as 1960, the four passenger elevators in the US Courthouse's (1952) main lobby were viewed as obsolete because they were run by operators rather than offering automatic operation. It was proposed that automating the

elevators would greatly improve service, providing continuous service at night, on weekends and holidays. An analysis showed that the savings accrued from the operators' salaries would amortize the cost of converting the elevators in just six years.

The present US Courthouse elevator cabs show some signs of cab modification from the 1960s project, which changed the cabs from operator to automatic operation. The original seat support hardware for the operators' use is found in three of the four cabs. However, the original cab walls are still intact. These walls are constructed of 1.5mm masonite backed with a 27mm wood core. The wood core is made up of a 3mm soft wood facing on both sides of a 21mm solid poplar wood center. On the finish face side of the panel is 1.5mm masonite faced with 0.5mm walnut wood veneer and a 0.5mm clear finish coating. The clear coating was tested and found not to be soluble in a range of standard solvents. It is not a lacquer, shellac, acrylic or alkyd based material.

The 1993 elevator project was initiated to bring the cabs into compliance with ADA. The project specifications called for cleaning the existing wall paneling with a mild, non-abrasive cleaner such as dish detergent, rinsed thoroughly, and waxed with furniture polish. Neither sanding nor abrading the surface was recommended.

All of the extant metal trim is brushed stainless steel, including the cabs' baseboards, handrails, control panels, auxiliary telephone and utility panels, entrance door surrounds, car location and direction indicators, and ceiling ventilators. This project's specifications required that new control panels match the original metal, although it is doubtful that the exact formula for stainless steel was matched. Numerous samples had to be submitted before the "brushed" finish was accepted as matching the original. The 1952 "brushed" metal finish would now be called a "satin" finish. It is closest to a No. 25 finish.

At some point in the past, the original car landing doors in the four public passenger cars were replaced with plastic laminate-faced doors, probably due to scaring and defacing of the originals. However, this true plastic laminate does not match the color or graining design of the precursor laminated wood paneling of the cab walls.

The specifications required the elevator contractor to submit products for matching the original laminated wood paneling for the car doors. However, after six submittals were rejected, and the contractor argued that no product could be found to "match" or replicate the laminated wood paneling, it was decided to replace the car doors not in a wood paneling but in stainless steel to match the original metalwork in the cabs. This decision to replicate a different original material rather than introduce a new man-made material was guided by the GSA's interest in following the original architect's intent.

With regard to the original floor tiles, the physical investigation of the cab flooring indicated that orange brown 12 inch by 12 inch "cork pattern" vinyl tile was found in elevator #6 and seemed to be the most worn floor surface located. A 6 inch by 6 inch blue "marble pattern" vinyl tile was found in elevator cabs #11 and #13 but appeared to be a newer installation. In addition, the historical architect believed that the orange-brown color was more consistent with the coloration of the cabs. The orange-brown tile was almost an exact match to Armstrong Imperial Texture Excelon Tile No. 51896 Paprika.

Since the entire platform was being removed, there was no reason to disturb the existing vinyl asbestos tile (VAT) flooring. The new tile could be glued directly down to a new subfloor for the cab platform. However, after award of the contract, the historical architect was notified that the specified tile was no longer in production. A new product line, Marmoleum, distributed by Forbo, was substituted. Its tiles are in the same range of hues as the original orange-brown tile, but the patterns are marbled, instead of the "cork pattern" of the original. This was the closest product found to reflect the original architect's intent aside from a custom run of flooring. The quantities were sufficiently small not to warrant such a solution.

The decision to replicate a material as closely as possible rather than ask a contemporary architect to choose a distinctly different material reflects a preference to match a material that is known to have been installed at some time rather than allow for replacement as intervention. It is preferable to follow the original architect's intent rather than walk the fine line between clear intervention and remuddling.

HUD Headquarters

Marcel Breuer chose his architectural materials carefully, since the simplicity of their forms

would provide the ornament to his buildings. However, the architectural concrete used throughout the building, including the large first floor cafeteria, was viewed by the building occupants as dirty and depressing. Rather than clean this material, they chose to paint over it with white latex paint as a maintenance activity. The results negated the original design. Furthermore, additional changes created a pseudo-park setting indoors - complete with street lights, iron railings, and wooden planter boxes. These actions were explicit desires for altering original twentieth-century materials, based on a perceived lack of ease of maintenance of the original finish.

GSA negotiated for the immediate removal of the paint along the architectural concrete window wall and the original exterior building entrance and its vestibule in the cafeteria. After testing two ProSoCo poulticing products - Enviro Strip #2 and Enviro Strip #3 (requires neutralization) - the areas described were very successfully stripped with Enviro Strip #3. The cost was deemed to be prohibitive to strip all sixteen painted columns. We will have to wait for a future renovation to take that paint off. In the meantime, a contract is being funded for chemical cleaning of all interior architectural concrete in order to restore it to its original appearance.

Hubert H. Humphrey Building

In the Hubert H. Humphrey Building, a building just twenty years old, there is a concern that if historic preservation guidelines are applied to this contemporary building, the federal tenants' ability to "update" their building to meet their new needs will be hampered. There is an explicit desire to alter the original design, and new functional needs are believed to be sufficient justification for removing the original materials as well.

This building's public teak elevator cabs had darkened over the twenty years since their installation, although the original finish could be seen in the Secretary's private elevator. The cabs also had a few scratches, particularly in the two elevator cabs serving the garage. There was obviously a lack of appreciation for the teak wood, which is, twenty years later, now a prohibitively expensive natural material. Replacement with formica had been designed and bid when this proposed change was brought to our attention by the Contracting Officer. GSA negotiated a design change with the successful bidder to rehabilitate the teak rather than replace it with Formica. However, the federal tenants do not support this attitude towards their building. How can it be historic when only twenty years old?

Conclusion

It is difficult to create an appreciation for twentieth-century materials. Familiarity breeds contempt. Furthermore, familiarity breeds a false sense of expertise regarding the replication of these "common" materials, when "matching" is the desired result. To truly succeed at replacement and retention of twentieth-century materials, an educational process must be undertaken for all involved. Appreciation for a material and its inherent qualities must be accomplished before "matching" can occur.

Replication may be prohibitively expensive, so substituting a material that comes as close as possible to the original may be the most one can hope for. Keeping the original architect's intentions at the forefront of the decision-making process will keep the assets from turning into liabilities.

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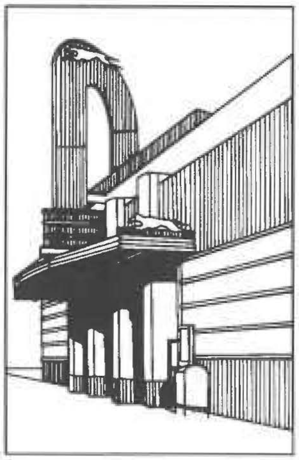
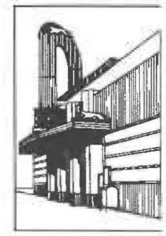


Shiny Surfaces and Structural Underpinnings



Twentieth-century Ornamental Metals and Their Care

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Ornamental metalwork has long played a significant role in the articulation of American buildings. In the 1830s, architect John Haviland designed cast-iron balusters for Philadelphia's Eastern State Penitentiary. On a larger scale, at the end of the nineteenth century, D.H. Burnham and Company spanned the interior court of the Ellicott Square Building in Buffalo, New York, with an ornate cast-iron trusswork.

But it was during the early years of the twentieth century that interest in the use of ornamental metals grew and their universe expanded and became much more complex. This paper surveys the most widely used of these metals, considers various efforts to conserve and maintain them, and suggests that only by understanding the specifics of their uses and finishes can we then design appropriate treatments and maintenance programs.

Twentieth-Century Metals

Throughout the first three decades of the twentieth century, custom-designed architectural bronze played an increasingly important role in the articulation of both the interiors and the exteriors of civic and commercial buildings and high-style residences. Foundries like William Jackson's and Jno. Williams' in New York, and the Gorham Company, in Providence, Rhode Island, responded to the growing demand for cast ornamental bronzework.

In creating architectural bronzework, foundries relied on the chemical patination of the metal's surface to obtain various effects. Skilled patinators achieved colors ranging from a muted gold, through brown, to almost black. Various shades of green were also available if an owner or architect wanted a corroded - or antique - appearance. The predominant coloration of architectural bronze in the late nineteenth and early twentieth century centered in a range of rich browns, now often termed a "medium statuary finish."

The mid-1920s witnessed a broadening of the coloristic range in the patinas that foundries applied to architectural bronze, as well as an increasing interest in lighter-toned patinas. This is most evident in buildings designed in the developing modernist styles.

By 1930, ornamental metalwork was keeping pace with current styles in sculpture and architecture, becoming a key component in the richly designed interiors of high-style office buildings. The Chanin Building in New York City features bronze panels that were influenced by Cubist and Futurist sculpture styles and set against richly colored surrounding stonework. During the 1930s, aluminum, nickel alloys, stainless steel, and other of the so-called "white metals" were touted for their inherent modernity and their corrosion resistance. Originally developed more for industrial and utilitarian uses than for their decorative potential, the new metals came into wide use during these years, and long-time cast iron and bronze manufacturers expanded their product line to include them. In 1929, Tuttle and Bailey, a New York City foundry, began advertising aluminum cast grills, as well as bronze ones, "in new and modish designs."

Among the early extensive uses of ornamental aluminum, the US Custom House (1933) in Philadelphia features cast aluminum exterior lamps and tympanum reliefs (Figure 1). Inside, aluminum is combined with bronze in the building's ornamental gates, doors, and stairs.

Other white metals used for architectural ornament include alloys formulated by combining various mixtures of copper, nickel, and zinc. Instead of applying a chemical patina, subtle color changes could be effected by adjusting the metal's composition. These compositional variations made possible the colossal medallions at Radio City Music Hall in which designer Hildreth Meier used cast and sheet aluminum, sheet copper, cast bronze, stainless steel, and porcelain enamel. In addition to being combined with other metals, the white metals were highly regarded because their neutral color harmonized well with richly-colored interior stone and tile work.

Among the strongest and most corrosion resistant of the white metals is Monel, composed of about a 2:1 ratio of nickel to copper. Developed in the first decade of the twentieth century, Monel's first architectural use was as a roofing material. But by the 1920s it was being put to a variety of uses that included the fabrication of ice cream cabinets and restaurant kitchen equipment.

Probably the most ambitious and creative interior use of Monel occurred in 1929 with the completion of the Union Trust Company Building in Detroit. A monumental sheet Monel screen separates the lobby from the main banking room, where the check writing desks and tellers' windows were also constructed of sheet Monel. Ornamentation was produced by cutting out geometric shapes, routing lines into the surface, and by laminating and welding sheets together to build up three-dimensional motifs. At the time of construction, architectural critics praised the bank's metalwork as expressive of the modern age. The angular ornamentation was viewed to be distinctly of its time, with its design guided by the nature of sheet metal and by the specific nature of the machinery used in its execution.

Another reason for Monel's popularity was its ability to receive a wide range of surface finishes, from a bright mirror-like finish, through a series of satin finishes that varied in luster. These were produced by using emery in oil on a buffing wheel. Wire brushes created a grainier surface, and sand blasting provided a soft, light gray finish.

Care of Architectural Metals

In its relatively protected environment, interior metalwork tends to fare much better than its exterior counterparts. But even a metal with the corrosion resistance of Monel requires appropriate maintenance. The degradation that interior metalwork *does* suffer is most often the result of its daily use coupled with inadequate or inappropriate maintenance. Bronze doors usually received a foundry-applied patina and protective coatings of clear lacquer when they were made. Without an ongoing maintenance program that periodically removes old lacquer and applies new coatings, the existing lacquer and the applied patina below it are worn away through use. In addition, some green corrosion products are often evident on kickplates below, likely the result of salts tracked in from winter sidewalks and chemicals used to clean interior floors.

When undertaken improperly, maintenance can damage, rather than preserve architectural metals. Conditions noted at the Fox Theater, a sumptuous 1928 movie palace in Detroit, illustrate this point. During most of its history, the exterior entrance and ticket booth received constant polishing to maintain their bright metal luster. This abrasive maintenance, over nearly fifty years, eroded much of the ornamental detail. In the early 1970s, two events occurred; the theater hit hard times, and the bronze maintenance ceased, leaving the bare metal to corrode. Recent efforts to restore the theater and its bronzework removed the surface corrosion to re-establish its historic bright metal surface, but this treatment further eroded already softened details. The bronze ticket booth inside the storm lobby, has survived in much better condition, not only because it exists in a more protected setting where it never suffered exposure to a harsh urban environment, but also because it did not receive the aggressive maintenance regimen that its outdoor counterpart did.

Perhaps the greatest current threat to the preservation of architectural bronzework results from the imposition of a contemporary aesthetic on the appearance of historic metal. Inspired in part by the flash of bright metal in recent buildings, like the well-known Trump Tower in New York, many owners of historic buildings with more darkly-patinated bronzework try to achieve a similar bright metal finish, often in a way that damages both the metal and its patina.

Because of the general misunderstanding of the fact that historic ornamental metalwork did not have a uniformly bright finish, it is almost always a leading candidate for sprucing up during a rehabilitation or just in an effort to add some eye-catching glitz that will provide a new

look to an older building. Unless it has been severely compromised by a hostile environment or destructive past cleanings, one should resist the urge to tamper with an historic patina. A patina should not be viewed as a superficial coating, but rather as an integral component of the bronze. Moreover, patination is an art form, requiring a skill possessed by very few of the technicians working with metal maintenance companies today.

Common, but inappropriate, treatments of ornamental metal range from those that have minimal impact to those that can seriously threaten the long-term preservation of the historic material. On the milder side of the scale of egregious treatment is the application of bright paints in an effort to "restore" the supposedly original bright finish. While this treatment probably does little damage, it nevertheless effects a major change in the character of both the metal features and the building.

At the other end of the spectrum are the most invasive treatments, which may leave some permanent damage to historic ornamental metals. Preparatory cleaning is often very aggressive, typically carried out with the use of harsh chemicals and/or power-driven wire brushes that abrade the surface to enable paint and clear lacquer coatings to better adhere. These harsh cleaning procedures cause considerable damage to relatively fragile metal surfaces and can undermine attempts to recreate true chemical patinas.

When chemical strippers are used, workers often fail to achieve an even cleaning; remnants of the earlier patina remain in corners, and chemicals are inadequately neutralized or allowed to remain too long on the surface where they corrode the freshly exposed metal. This often results in an uneven repatination, particularly when a light or high-keyed patina is desired.

Philadelphia's N.W. Ayer Building (1929) displays abrasive cleaning, bright metal, and brown spray paint that have come together in a garish ensemble (Figure 2). After bringing the surface down to bare metal, the contractor effected a reworking of the entrance designed by architectural sculptors Kelly and Sabatini, by applying clear lacquer to the surface, masking out the areas that were to remain bright, and then painting the rest. Close inspection of the heavily abraded surface reveals the significant amount of damage done to the very subtle low-relief panels.

Sheet copper, which usually forms a very even and chemically stable green corrosion layer, has also been the object of harsh and unnecessary cleaning to bare metal. The pressure exerted during cleaning can deform the thin copper sheets, revealing the form of the structural support behind it. Current owners of buildings with formed copper bays, cornices, and storefront elements have probably never considered that the structure's original owner found that the stable green patina, like that found on the Statue

Figure 1. Lighting fixture and tympanum at the US Custom House in Philadelphia, completed in 1933, illustrate an early use of cast aluminum architectural ornamentation. (Photo by author)

of Liberty, was both aesthetically desirable and protective of the metal beneath it. Aluminum, too, can deform if subjected to aggressive cleaning applied with excessive pressure.

In contrast to these heavy-handed treatments, there exist a few examples of metal maintenance procedures that, while not completely successful, are at least pointed in the right direction. The Strawbridge and Clothier Store on Market Street in Philadelphia was completed in 1929 with entrances and storefronts cast by Superb Bronze & Iron, of Brooklyn, New York (Figure 3). The store's owners long ago made an aesthetic decision to leave the cresting untreated, allowing it to acquire a green corrosion layer. For the last sixty years, Strawbridge's maintenance staff has been applying oil to the bronzework below the cresting about every six months, a procedure that has kept the bronze in fairly good condition. Maintenance is often limited to easily reached areas, and a too liberal use of oil - coupled with a failure to remove earlier accretions of oil and grime - has caused some problems, but this treatment has done little real harm to the bronze surface.

Figure 2. The inappropriate, high-contrast refinishing of the bronzework on the N. W. Ayer Building (detail) was achieved through abrasive cleaning to bare metal, followed by selective painting. This "eye-catching" look was undoubtedly intended to attract public attention. (Photo by author)

Figure 3. Cast bronze storefront at Philadelphia's Strawbridge & Clothier department store has been sensitively maintained over the years. Grillwork has been routinely oiled, while cresting above has remained untreated and allowed to develop a chemically stable green corrosion layer. (Photo by author)

Another somewhat happier story involves the Fidelity-Philadelphia Trust Building on South Broad Street in Philadelphia. Completed in 1928, the building features three grand portals on its main facade. Each of the three paired bronze security doors depicts Renaissance-inspired figures modelled in low relief. Above are lamps in front of recessed multi-light panels surrounded by a gilded frame. A motif of vines and birds decorates the door jambs. Like the Strawbridge and Clothier Store, the Fidelity Building's bronzework has received regular applications of oil. The surface remains in very good condition, showing a build-up of grime in recessed areas, but no surface corrosion. At the suggestion of the metal maintenance company engaged to clean the bronze, the building's owners decided to strip the bronze of its existing patina, repatinate the bare bronze and then highlight the decorative motifs by abrading the raised areas before application of clear lacquer coatings.

Figure 4 Fidelity-Philadelphia Trust Building (detail panel of bronze security doors) was designed with darkly-patinated bronzework to convey a sense of stability and sobriety to the banking public. This metalwork was sensitively cleaned with mineral spirits and then coated with microcrystalline wax. (Photo by author)

Fortunately, they were receptive to a second opinion: that given the bronzework's excellent condition, a less aggressive cleaning treatment seemed more appropriate. A test sample was produced by applying mineral spirits with a cotton rag, thereby removing the oil and built-up grime from the surface. Some incidental highlighting appeared on areas where the patina had been worn off by successive oil applications. Limited repatination was recommended for these localized areas of bright metal. Following cleaning, the surface received an application of microcrystalline wax (Figure 4). A maintenance schedule calling for a periodic detergent cleaning followed by a reapplication of the wax coating was prepared, but it was never put into effect. Without maintenance of the somewhat delicate wax coating, corrosion products are beginning to develop from urban pollutants and from a highly acidic human phenomenon known euphemistically as "night rain." In hindsight, an application of a more durable clear lacquer, perhaps augmented by a wax top coat, may have been a better coating choice.

It is instructive to consider two well-known buildings whose owners possess a strong corporate commitment to the long-term maintenance of metalwork. New York's Chrysler Building (1930) displays a combination of highly polished and unpolished Nirosta steel, a trade name for an alloy steel containing nickel and chromium. Inside the building, Nirosta appears in storefronts, doors, radiator grills, and directory frames. Its bright, machined appearance embodies the modernity architect William Van Alen and owner Walter Chrysler wanted their building to convey. In addition, it was chosen because it would require only minimal maintenance, a fact borne out by recent discussions with the building's chief engineer, who reported that the interior metal receives regular wipe downs of mild detergent and water.

Designers of the Empire State Building (1931) made extensive use of aluminum for its interior metalwork. Elevator doors, which are trimmed with inset brass strips, receive a new lacquer coating about every eighteen months as well as frequent wipe downs as part of the lobby's regular maintenance. Aluminum and brass bridges, located overhead, away from human contact, receive fresh lacquer every three years.

Conclusion

How should one go about planning for the preservation of architectural metals? Generally speaking, there can be no one formula for the

preservation of a material that is so diverse in its metallurgical composition, its finish, and its expressive intent. Add another layer of analysis that must examine the history and condition of a specific metal feature, and the decision-making grows more complex. But a few general suggestions apply to nearly all situations.

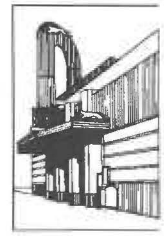
Before attempting any kind of cleaning, try to know what you are dealing with by doing your homework during the early phases of project planning. If you can determine who produced your metalwork, you may well discover that the company exists today and has both archival holdings and a corporate memory to assist you. Also, you may want to consult a metals or architectural conservator who possesses a thorough knowledge of architectural metalwork and can provide you with sound preservation guidance. Finally, when choosing treatments, err on the side of caution, and choose the gentlest, least invasive option available.

Published sources may help as well. Two particularly useful ones are the relatively short-lived trade journals *The Metal Arts* and *Metalcraft*.[1] Published from the late 1920s through the early 1930s, they provide a wealth of information on the white metals - aluminum, Monel, and the chromium steel alloys - being developed and used during those years. Particularly informative are the articles detailing processes. For example, in 1928, *Metalcraft* guided its readers through the process by which the ornamentation on bronze elevator doors is created by acid etching. Through a series of articles, *The Metal Arts* examined the entire process of creating monumental bronze doors, from an architect's rough conceptual sketches, through the sculptor's refinement of the design, the casting, the finishing, and finally to the assembly and installation of the completed doors.

These publications and the many trade catalogues produced by manufacturers of ornamental metalwork, ranging from high-style bronze doors to mass-produced pressed metal ceilings, can provide something beyond factual information about production and finish. They can inspire caution in the treatment of architectural metalwork, by raising awareness of its significance and its fragility. They can also instill respect for an irreplaceable resource that is the product of the combined efforts of patrons, sculptors, architects, designers, and craftsmen, which has been passed down to us as a cultural patrimony.

Notes

[1] *The Metal Arts* (New York, New York: J. Kreiger, November 1928-September 1930) and *Metalcraft* (Jamestown, New York: Furniture Publishing Corporation, July 1928-July 1932).



Research and Restoration of Buckminster Fuller's Dymaxion Dwelling Machine (a work in progress)

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Introduction

Every structure presents research challenges that arise from technical issues. For instance, some architectural restoration techniques - those designed to accurately recover the form and details of a structure by replacing missing or damaged work - may be challenged by the nature of materials. When an oak timber from a seventeenth-century frame house in Essex County, Massachusetts, is missing, another oak timber should be used to replace the missing work. But what does one do when confronted with a structure of high tension chrome-moly steel rods, aluminum panels, and a band of Plexiglas windows? Which bolt do you loosen first? Does it matter if the bolts are steel or aluminum or should we just say metal fasteners? Many architects and historic preservation professionals do not have access to information on building materials introduced and marketed during the first half of the twentieth century. The following essay is a work in progress that focuses on the research and restoration of R. Buckminster Fuller's Dymaxion Dwelling Machine, a case study of accessing information on twentieth-century building materials.

Historical Background

In the 1920s, Fuller designed a house that could have been mass-produced like one of Henry Ford's automobiles. Fuller's vision incorporated pneumatic floors made of rubber, covered with imitation leather to cushion a person's step and offer domestic comfort and relaxation to those who stood on concrete all day. The kitchen, referred to as the "Catch-Up-with-Life-Room," included an electric-vacuum-range similar to a modern day Jenn-Air stove. The living areas were partitioned by a factory assembled "Utility-of-Choice-Unitary-Modules" that included a desk, filing cabinet, typewriter, calculating machine, telephone, radio, television receivers, and phonograph. The library, called the "Creative-Abstract-Go-Ahead-with-Life-Room," was connected to the other rooms establishing a one-story hexagonal volume suspended from a single, central mast.[1] The mast, a mechanical core that centralized plumbing and electrical power, was designed with a passive heating and cooling circulation system that filtered dust and made the house "self cleaning." Unlike conventional weight-bearing walls, the mast made it possible to reduce the amount of materials by more than ninety percent, measured by weight. But malleable materials appropriate to fabricate such a house were not available in the late 1920s. Fuller had to wait for such technological advancements as malleable aluminum and acrylic plastic to build what the public had come to know as the Dymaxion (DYnamic-MAXimum-TensION) House.[2]

During World War II, military aircraft production sped the development of stronger alloys of aluminum, thermoplastics, and acrylic plastic.[3] In the Fall of 1945, the end of the war seemed apparent, and the nation had an excessive aircraft production capacity. As orders for new aircraft diminished, Fuller, along with other entrepreneurs like Carl Strandlund of Lustron Homes and Preston Tucker, creator of the Tucker Torpedo automobile, began to focus on the peacetime conversion of aircraft facilities and technology to build new products and industries.[4] Fuller contracted with the Beech Aircraft Corporation, maker of the C-45 Trans-

port aircraft, to build a new version of his Dymaxion House - the Dymaxion Dwelling Machine - using these new materials (Figure 1).

Two prototypes of the Dymaxion Dwelling Machine, made of aluminum, stainless steel, acrylic, and plywood, were erected between 1945 and 1946.[5] The dwelling machine was 36 feet in diameter, 22 feet tall, weighed 6,300 pounds (without interior furnishings) and had 1072 square feet of living space. The structure had a passive heating and cooling system, which achieved total air exchange every six minutes. Other features included two one-piece self cleaning bathrooms, motorized "ovolving" shelves (from his 1920s design), and the ability to take the house apart, pack it in a can and ship it via truck, rail, or airplane to another location. Fuller's design was not just a new house, it was a living machine.

Fuller's company never finished the prototyping of the house and the company failed in 1947 as the result of infighting among its principals. William Graham, one of the directors on the board of Dymaxion Dwelling Machines, Inc., acquired both prototypes, erected one in 1948 for his family and stored the other for spare parts. The Grahams lived in the Dymaxion Dwelling Machine until 1972 and, throughout the years, significantly altered the structure using parts of both houses. The existing structure and parts of the other Dymaxion Dwelling Machine prototype were donated to Henry Ford Museum & Greenfield Village by the William Graham Family in 1991. The structure was subsequently disassembled and shipped to the museum's facilities at Dearborn, Michigan, where it is currently being restored to its original prototype stage of 1946[6] (Figure 2).

Finding Information on Twentieth-century Building Materials

Many books have been published on the use of such twentieth-century materials as Bakelite (phenolic resin), acrylic (polymethyl methacrylate), and aluminum for products like jewelry, radios, and kitchenware, but few books have been published on modern architectural materials. Moreover, there is very little written on architectural aluminum. Until more work is published there are a number of ways to access building material information.

Three good sources we used for accessing information for the Dymaxion Dwelling Machine were trade associations and companies who produce building materials, industrial collections (private and public), and newsreel archives. Developing relationships with trade associations and companies involved with the production of building materials is a great place to begin to access information for a twentieth-century architectural restoration project. Organizations such as the Aluminum Association Inc. and Industrial Designers Society of America were extremely helpful in our search for information. The Aluminum Association Inc., a trade association of American aluminum manufacturers, is very interested in the preservation of twentieth-century aluminum structures and supplied us with the names of aluminum alloy specialists, aluminum corrosion specialists, and a list of companies that still have aluminum alloy extrusions, tubing, and rolled sheets from the 1930s, 1940s, and 1950s.

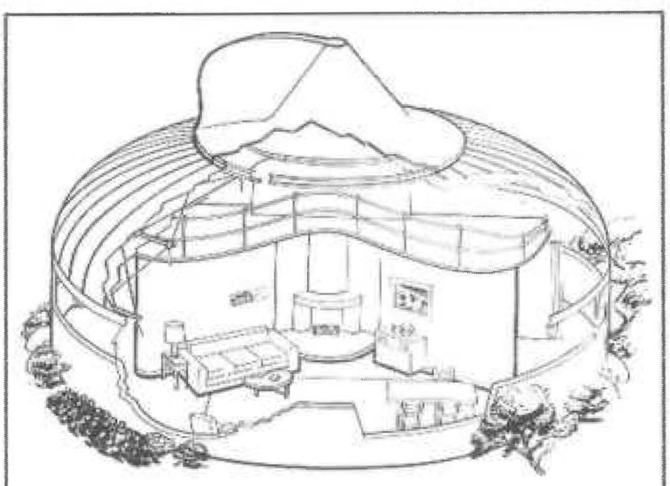

Figure 1. Cutaway line drawing of Dymaxion Dwelling Machine, 1945. (Copyright 1994 Allegra Fuller Snyder. Courtesy Buckminster Fuller Institute, Santa Barbara, California.)

Figure 2. Dymaxion Dwelling Machine Prototype A with Packing Cylinder, 1945. (Copyright 1994 Allegra Fuller Snyder. Courtesy Buckminster Fuller Institute, Santa Barbara, California.)

Manufacturers of twentieth-century building materials marketed their products in trade catalogues as well as trade periodicals. *Thomas Register of American Manufacturers*, published yearly since 1905, includes information on products and services, company profiles, and product specifications, drawings, photos, and performance data. Many trade magazines focus on wood, metals, organic fabrics, synthetic fabrics, plastics, laminated materials, and glass. Once we identified the makers of specific building materials, we contacted their public relations departments and informed them of our restoration project and the possibility that their company may have been involved with Fuller in the project in the 1940s. Most companies were extremely helpful in allowing us access to their archives, collections, or product libraries. It is important to note that one phone call, in most cases, will not be sufficient to acquire information from private companies. The biggest obstacle that we had to overcome with most organizations was that they were unaware of historical archives, collections, and materials in their possession. Usually, many people were contacted in an organization before materials were identified. Most companies were very helpful once we fully informed them of our project and how we planned to use the information we were requesting. Many organizations still owned their business archives or had deposited them in institutions such as universities, museums and historical societies (see appendix). However, some companies have destroyed their business records and archives, and unfortunately, part of the story of twentieth-century building materials is destroyed as well.

The popularity of new housing and commercial building ideas in the early twentieth century also was documented by newsreels. Newsreels, like many newspapers or journals, contain stories about the causes and effects of American life. Unlike newspapers and journals, newsreels use a series of images to describe the story while the narrative acts as an outline or explains transitions between scenes. The final edited films are usually between two and three minutes in length. However, for each minute of an edited final cut, there are eight minutes of out-takes stored in film libraries and archives.[7] Prefabricated housing, suburban developments, commercial buildings, interiors, dedication ceremonies, plus many other subjects focusing on architecture are recorded on 35mm footage and preserved in film archives with excellent finding aids. Film archive categories are generally organized by the visual image of the film scene. In the case of the Dymaxion Dwelling Machine, we searched under the categories of aluminum, appliances, architecture, dwellings, factories, hanging house, home, house, housing, industry, inventions, manufacturing process, new innovations, plastics, prefabrication, tenement houses, and war industry.

We found a variety of films concerned with prefabricated housing and three films that focused entirely on the Dymaxion Dwelling Machine.[8] These films revealed how the house worked as a machine with its passive ventilation and motorized shelving systems. Scenes showing how the structure was assembled, along with original interior furnishings, is extremely valuable for restoration purposes. Using newsreels as historical documents also offers an historical context that may not be accessible in drawings, photographs, and parts lists. Newsreels record human interaction with structures, and they are also indicators to popular ideas in the twentieth century.

In one case, we needed to define whether a kitchen was designed for the Dymaxion Dwelling Machine prototype in 1946 and if so, whether it was ever built and installed. Fuller had contacted Westinghouse, General Electric, and Monitor Equipment Co. for help in designing and supplying a kitchen unit for the Dymaxion Dwelling Machine.[9] We knew a kitchen existed in the 1946 prototype because of a letter stating that two men arrived in Wichita to set up a kitchen for the Dymaxion Dwelling Machine before Paramount News filmed the house.[10] First, we began the search for the newsreel, which we found deposited at Sherman Grinburg Film Libraries in New York. The film "Housing - Definitely the Newest" (April 1946) showed everything but the kitchen.

We then contacted Westinghouse and General Electric (Monitor Equipment Co. no longer exists), but they could not find anything in their archives. A few months passed, and we came across a note in Fuller's archives stating, "one unassembled kitchen unit will arrive this week from Louisville," signed John E. Menz. We searched the Louisville city directories of 1945 and 1946 and found out that Reynolds Metals Company had an aluminum manufacturing plant in the city. Reynolds Metals Company's public relations department was very enthusiastic about our project and agreed to search their archives. Six months passed; then Reynolds sent us a file of letters and drawings identifying an aluminum kitchen unit designed by Guyon L.C. Earle to be used in Fuller's Dymaxion Dwelling Machine.

Figure 3. Earle Kitchen unit, Forest Hills, New York, 1945. (Fay S. Lincoln Collection, 1070 P1, Historical Collections and Labor Archives, Pennsylvania State University)

After identifying the design of the kitchen unit, the next step was to find out if one still existed. Letters and copies of the kitchen unit drawings were sent to Beech Aircraft, Reynolds Metals Company, preservation societies, and Wichita historical societies describing our search for the original kitchen. We also began to research the background of Guyon L.C. Earle, as well as trade journals, home decorating, and remolding books. First, we found a picture of Earle's kitchen in a home remolding book (Figure 3). The credits cited Earle as being a designer who lived in Forest Hills, New York, and the photo credit was F.S. Lincoln.[11] We then found a trade journal describing Earle's kitchen units; he built over one thousand kitchen units and installed them in Forest Hills and Manhattan apartment buildings.[12] Knowing that the Earle kitchen unit was mass-produced, we focused our search in the New York City area.

Searching through the On-Line Computer Library Center and the Research Libraries Information Network (OCLC-RLIN), we found a dozen photographs of Earle kitchen units shown in various apartments in the Fay S. Lincoln Photograph Collection deposited at the Pennsylvania Historical Collections and Labor Archives at Pennsylvania State University. The photographs were distributed to historic preservationists, architectural firms, museums, and historical societies in the New York City area. We even enlisted the *New York Times'* aid in our efforts to find an Earle kitchen unit.[13] A few months later, we received a phone call from James Driscoll, a volunteer at the Queens Historical Society. Mr. Driscoll had received the photographs of the Earle kitchen unit and was intrigued that such an innovative object had its roots in Forest Hills. He located the apartment building in Forest Hills where Earle had his office during the 1940s, and asked the manager if any Earle kitchen units were installed in the apartments. The manager allowed Mr. Driscoll to knock on the residents' doors to inquire about the kitchens. He actually found three Earle kitchen units in fairly good condition, one of which is now at our facilities in Dearborn being catalogued and restored for the Dymaxion Dwelling Machine exhibition. Many people were involved in the search for the lost Dymaxion Dwelling Machine kitchen. "The search had started with one letter."

Cataloguing and Identifying Twentieth Century Materials

Cataloguing is an important part of the architectural restoration process especially if the structure has been dismantled. Descriptive, detailed cataloguing organizes the structure, but it is also an essential analytical process that creates a better understanding of it. In our case, we dismantled a structure that had changed significantly since its prototype stage in 1946. The structure we dismantled was built with a mast upon a cement foundation complete with basement, instead of hanging solely from a stainless steel mast three feet above the ground. The HVAC system was attached through the roof rather than the floor. A dinette with a built-in sideboard replaced a former bathroom and bedroom. Where there once was an aluminum fireplace stood a steel circular staircase. Cataloguing not only identifies the parts and organizes them into systems, but it also allows us to trace the history of the structure through its historical fabric.

Before the dismantling of the Dymaxion Dwelling Machine, a complete set of measured drawings showing the existing conditions were made using standards and techniques established by the Historic American Buildings Survey (HABS) of the National Park Service[14] (Figure 4). During the dismantling process, every part was numbered and photographed and dozens of sketches were made. The structure had been abandoned since the late 1970s, and deterioration such as aluminum corrosion was evident. The Dymaxion Dwelling Machine has over 10,000 parts made of a number of different materials including: mahogany plywood and pine plywood, antimony-plated copper, chrome-moly and 18-8 stainless steel, porcelain enameled steel, naugahyde, fabrikoid, fiberglass-backed neoprene, nylon, thermoplastics, acrylics, and a dozen different aluminum alloys. Each part was examined and catalogued separately using inventory worksheets (Figure 5) with the following categories:

Date: date of examination.

Record Number and Item number: The record number represents the part form, and the item number represents the actual part.

Part Name and Part Number: Original name and number taken from drawings and part lists from the 1940s.

System: Refers to structural systems such as foundations and walls.[15]

Source: Indicates whether the part was original (belonging to prototype A,B,C, or D) or an addition by the Graham family.

Dimensions: Parts were measured in U.S. measurement because they were designed and fabricated using U.S. measurements.

Material: Specific description of building material including, alloys, composites, and finishes.

Location: represents where the part is currently stored, an important category when cataloguing an object as immense as an architectural structure.

Marks: Include makers identification, dates, material designation numbers (such as alloys and finishes), and color codes.

Disassembly Number: Number assigned and tagged to a part during disassembly of the structure.

Notes: Any information in addition to the previous categories that helps to identify the part. Notes also includes sources of information, including books, drawings, parts lists, and receipts, used to identify the part.

Condition: Each part is individually examined for condition in four categories of Excellent, Good, Fair, and Poor.[16]

All of the information was then loaded into a database for easy access and cross referencing categories. The database included a bibliographic file, photographic file, actual parts list (catalogued and examined), and a historical parts list created from original measured drawings, engineering drawings, parts lists, and shipping invoices (Figure 6). After cataloguing the house, we generated parts lists from the database for cleaning, conservation, restoration, and refabrication. Before any treatment was suggested, we researched the structural characteristics and alloy designation numbers of the parts.[17] Companies such as ALCOA and Reynolds Metals Company, which manufactured aluminum components prior to 1950, used their own alloy designation systems.[18] Aluminum alloy designation numbers changed to an international coding system in the early 1950s. Once we identified the aluminum alloys, we

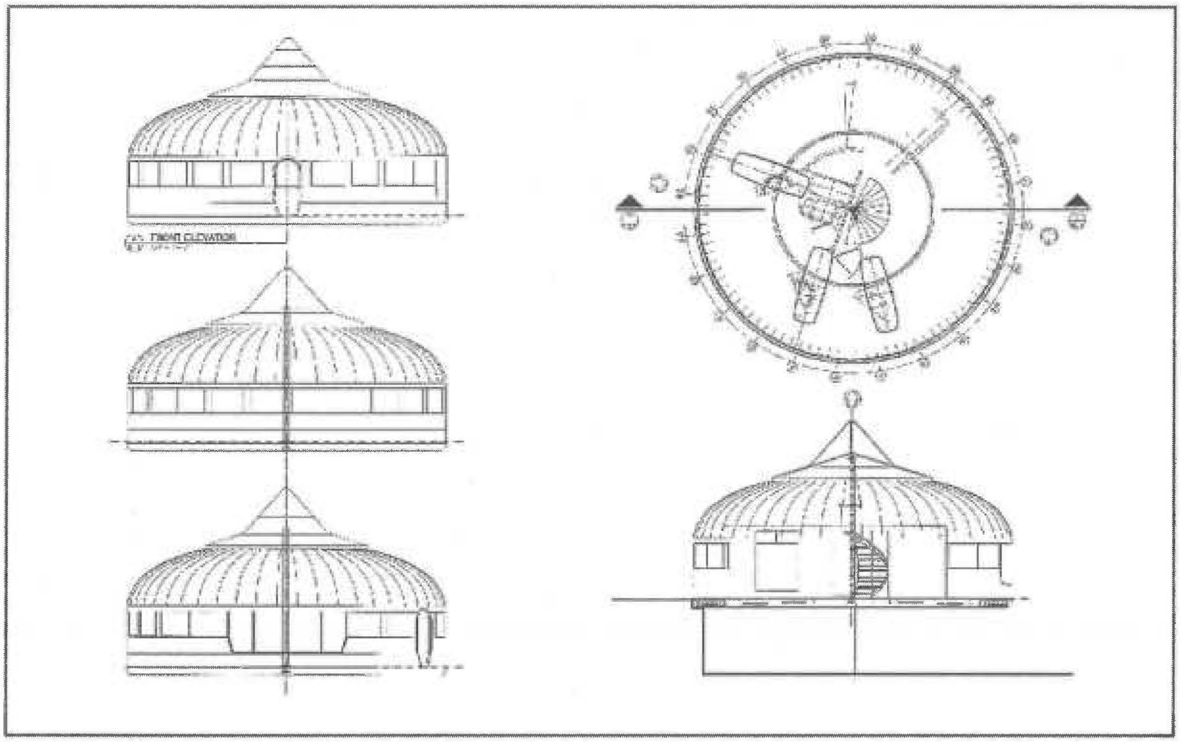

Figure 4. Dymaxion Dwelling Machine, Andover, Kansas, 1992. (Delineated by Jeffrey C. Bourke, RA. Copyright 1994 Henry Ford Museum & Greenfield Village.)

began a search for more detailed information of their methods of manufacture, applications in other industries, and deterioration characteristics.

Care and Cleaning of Architectural Aluminum

In the course of cataloguing, Clara Deck, conservator at Henry Ford Museum & Greenfield Village, and I realized that some of the structure's major aluminum corrosion problems were not going to be restored easily. However, we made the decision that the restoration process of the Dymaxion Dwelling Machine will attempt to repair and use all historic fabric rather than replace by refabrication, if possible. We realized that we were in over our heads and that we needed to create a team of technical experts to help us in the assessment of the aluminum alloy corrosion problems and to test various methods of cleaning and repair.

We found that the key to stabilizing and preserving architectural aluminum structures, like most architectural materials, is preventive maintenance. The care used in cleaning architectural aluminum may determine whether or not the structure will be preserved for the future. The frequency of cleaning is determined by the desired appearance of the metal and local atmospheric conditions.[19] Aluminum surfaces are not as resilient as brass, bronze and stainless steel. In fact, most alloys used for exterior applications have thin layers of either pure or anodized aluminum, painted or plated to protect the surface. Gouges and scratches that penetrate the protective surfaces will cause damage that can result in corrosion or a pitted surface caused by dirt and moisture.[20]

Preliminary Cleaning - The care and cleaning of most architectural aluminum starts with the removal of loose dirt and other hygroscopic materials such as paper lining, insulation etc. Removing the debris by carefully using a soft brush and a vacuum is the preferred method of preliminary cleaning. This process will help keep the damage to the surface at a minimum. Preliminary cleaning is extremely important if the aluminum is going to be stored for a period time before it can be fully cleaned and treated.

DYMAXION HOUSE INVENTORY WORKSHEET

10/24/93

Record Number 1010 Item Number 047

Part Name WINDOW LEDGE Part Number CDS-1.04

System OUTER SKIN

Source: Graham ___
Prototype A X
Prototype B ___
Prototype C ___
Prototype D ___

Dimensions (H x W x L) .064" x 6½" x 57"

Material 24 S-T Aluminum

Location F1 Museum Lab 1

Marks "AN-A-13 PURECLAD 24S-T" / "B9"

Disassembly Number S2

Notes: Curtain Strip is used to attach Tan Naugahyde. Part #1616.009 is also attached to this part.

Condition: Excellent ___ Good ___ Fair ___ Poor X

Condition Notes: Light galvanic corrosion with minimal exfoliation; Black tar on underside; A 1½" x 1½" square is cut out of part (hole not original).

Figure 5. Examination and Catalog Worksheet.

```
Page No.   12
12/02/94

RECNUM       1010
PROTOTYPE    A
SYSTEM       Outer Skin
DRAWINGNUM   CDS-1.04
PARTNUMBER   CDS-1.04
PARTNAME     Window Ledge
DIMENSIONS   .064 x 8-1/2 x 57
MATERIAL     24ST Aluminum
TOTALPARTS   22
DESIGNER     C.L. Snider
DATEDESIGN   04/03/45
MANUFACTUR   Beech Aircraft Corporation, Wichita, KS
MANUDATE     08/18/45
DELIVDATE      /  /
AUTHOR       James Ward
TITLE        The Artifacts of R. Buckminster Fuller, Volume Two
PUBLISHER    New York: Garland Publishing, Inc., 1985
PAGENUMBER   163
PHOTONUM     JB-05.13
MEMO
NOTES        Material produced by Reynolds Metals Company, Louisville, KY. 1945.
```

Figure 6. Dymaxion Project Database: Part List file created from original drawings, parts lists, and shipping invoices.

Most damage to aluminum, galvanic corrosion and excessive staining, occurs when it is stored improperly. Do not store aluminum in ordinary acidic paper or cardboard containers, which are themselves hygroscopic. As well, do not store aluminum in direct contact with shelving or floors comprised of other metals such as unpainted steel. Use polyethylene foam or an inert plastic sheet separating the aluminum to protect against corrosion.

Mild Cleaning (performed after preliminary cleaning) - A rule to remember when cleaning aluminum is to stay away from abrasive and strongly acidic chemical cleaners that may cause etching. Aluminum will corrode in the presence of strong acids or strong bases used in most heavy duty cleaners. Lightly soiled aluminum can be cleaned with a mild soap added to water and applied with a soft cotton cloth, a soft brush, or a sponge. After the surface is cleaned, the soap must be removed immediately with a clear water rinse and thoroughly dried. Mild cleaners include most soaps and detergents that can be used safely with bare hands. These mild cleaners may be used on most aluminum surfaces.

Note that mild cleaners must be applied as directed by the manufacturer and never applied on sun-heated aluminum nor on cold temperature aluminum: staining and streaking may result.[21] Tap water contains metal salts, and other contaminants. If possible use distilled water to avoid contamination.

A preliminary treatment using mild cleaning methods on the disassembled Dymaxion Dwelling Machine helped to stabilize the aluminum and reduce the rate of further corrosion damage. The aluminum parts were then stored indoors, separating each piece with sheets of polyethylene foam. We may use a rather high-tech solution for long-term storage - a proprietary system using vapor phase-inhibitor impregnated plastic to seal each individual piece. The idea is to temporarily protect the cleaned surfaces, because we will not apply a protective surface coating until we are ready to reassemble the structure. The vapor phase-inhibitor impregnated plastic provides temporary protection by moisture exclusion and by the corrosion inhibitor, which is slowly released from the plastic sheeting and absorbed onto the surface of the

aluminum. Note that storage temperature must remain above the dew point to prevent condensation.

After the structure was stored safely, we could research and test for the next treatment stage of restoration cleaning - removal of paint and black tar coatings, as well as corrosion removal. The coatings of paint and tar are not original to the structure and have to be removed for a successful restoration. Parts of the structure have medium and severe corrosion problems that have damaged the surface of the aluminum and contributed to the loss of material. Mild cleaning is not successful for the removal of these coatings and corrosion products. We are currently testing a myriad of techniques and methods to treat the surfaces including grinding, chemical corrosion removal, and high-pressure steam with and without a cleaning compound.[22] As well, we will attempt to remove paint and black tar coatings by soaking the parts in solvents. We intend to publish the results of our analysis of aluminum cleaning processes at a later date.

Acknowledgments

The efforts of our restoration team: conservator Clara Deck, conservation technicians Peter Bernardi, Norb Seely, Nubia Wardford; interns Wil Shapton and Eben Burr; and corrosion consultant Dr. T. David Burleigh, have contributed to make this project possible.

Notes

[1] R. Buckminster Fuller, *4D Time Lock*. 1929. (Reprint Albuquerque: Lama Foundation, 1972), 20-22.

[2] The term Dymaxion was coined by Waldo Warren, an advertising man working for Marshall Field in Chicago, in 1929. See Robert Marks, *The Dymaxion World of Buckminster Fuller* (New York, New York: Reinhold Publishing Corporation, 1960) 21. Fuller defines Dymaxion as dynamic-maximum-tension in letter, R. Buckminster Fuller to Arthur Sweet, 3 June 1929, Dymaxion Chronofile, Volume 36. Buckminster Fuller Institute, Santa Barbara, California.

[3] Acrylic resin (methyl methacrylate) was developed by Du Pont in the early 1930s and marketed in 1937 as "Lucite." Acrylic was used in World War II aircraft and later by Fuller as a building material because it provided excellent resistance to weathering, high impact strength, and resistance to shattering. In addition to the Du Pont company, which was the first U.S. producer, domestic manufacturers of acrylic resins included Rohm & Haas Company (trade name "Plexiglas") and American Cyanamid (trade name "Acrylite"). See undated memo on Du Pont Plastics and E.I. Du Pont Company, *DuPont Products Index: Better Things for Better Living Through Chemistry* (Wilmington, Delaware: Du Pont Company, 1946), Du Pont Corporate Archives, Hagley Museum and Library, Wilmington, Delaware. Also, The first application of aluminum in architecture was in 1884, when an aluminum tip, weighing six pounds, was mounted on top of the Washington Monument obelisk. Aluminum was considered a precious metal in the late nineteenth century until Charles Martin Hall, a student at Oberlin College in Ohio, and Paul T. Heroult in France simultaneously discovered a more efficient and economical way of producing aluminum through a electrolyzed process. In 1892 aluminum was being used for the frames of dirigibles and by 1933 it was applied to bridge construction. Between 1935 and 1944, aluminum production increased two thousand percent. Aluminum-copper alloys that were developed by ALCOA and the Reynolds Metals Company for World War II aircraft production were soft, malleable, and had comparable strength of a high-tensile steel. However, the aluminum-copper alloys were usually one-third the weight of steel. See Henry J. Cowan and Peter J. Smith, *The Science and Technology of Building Materials* (New York, New York: Van Nostrand Reinhold Company, 1988), 89-91, and John Peter, *Aluminum in Modern Architecture*, Volume 2 (Louisville, Kentucky: Reynolds Metals Company, 1956), 13-15.

[4] See H. Ward Jandl, "Lustron: The All-Metal Dream House," *Yesterday's Houses of Tomorrow* (Washington DC: The Preservation Press, 1991) 183-184, and Philip S. Egan, *Design and Destiny: The Making of the Tucker Automobile* (Orange, California: On the Mark, 1989), 22-23.

[5] There were four different stages of prototyping for the Dymaxion Dwelling Machine. Prototypes A and B were complete structures. Prototypes C and D were experiments with different support systems and only a few parts exist.

[6] The Dymaxion Dwelling Machine was the first artifact acquired with the institution's new mission statement: "Henry Ford Museum & Greenfield Village provides unique educational experiences based on authentic objects, stories, and lives from America's traditions of ingenuity, resourcefulness, and innovation. Our purpose is to inspire people to learn from these traditions to help shape a better future." For a detailed description of how Henry Ford Museum & Greenfield Village's mission relates to documenting twentieth century culture see Christian Øverland, "A Case Study of Documenting Twentieth Century Culture: Systems for Living - The Dymaxion Dwelling Machine," *Proceedings: 1994 ALHFAM Conference & Annual Meeting* 19-23 June 1994, David Donath, editor, Volume 17. (Troy, New York: Association for Living Historical Farms and Agricultural Museums, 1994), and Mary Seelhorst, "Maximum Collection Dynamics: A Tradition of Change at Henry Ford Museum & Greenfield Village," *Cultural Resource Management* 16, no. 6 (1993): 12-15.

[7] The United States National Archives, Motion Picture and Video Branch has out-takes for Paramount and Movie-Tone Newsreels.

[8] Fox-Movietone News, *Home of the Future* (Columbia, South Carolina: Newsfilm Collection, Newsfilm Library, Instructional Services Center, University of South Carolina, November 15, 1929); March of Times Newsreel, *The Housing Dilemma* (Columbia, South Carolina: Newsfilm Collection, Newsfilm Library, Instructional Services Center, University of South Carolina, May 1946); and Paramount News Reel, *Housing - Definitely the Newest* (New York, New York: Sherman Grinburg Film Libraries, Inc., April 1946)

[9] Letter, Herman Wolf to Ted K. Quinn of Monitor Equipment Company, 16 October 1945. Dymaxion Chronofile, Volume 107.

[10] Letter, Cynthia Lacey to Fuller & Wolf, 18 March 1946. Dymaxion Chronofile, Volume 112.

[11] George Nelson and Henry Wright, *Tomorrow's House: A Complete Guide for the Home-Builder* (New York, New York: Simon & Schuster, 1946), 94

[12] James J. Corey, "Trends in Modern Refrigerator Design," *Refrigerating Engineering* (1944): 12-19.

[13] Gray, Christopher, "A Forest Hills Find for Fuller's Dymaxion House," *New York Times* (17 April 1994).

[14] See John A. Burns, editor, et al., *Recording Historic Structures: Historic American Buildings Survey/ Historic American Engineering Record* (Washington DC: The American Institute of Architects Press, 1989), and National Park Service, *Guide to Written Reports for the Historic American Buildings Survey (HABS)* (Washington DC: National Park Service, Cultural Resources Planning Branch, National Register Programs Division, Cultural Resource Management, October 1990).

[15] Fuller used nautical and aircraft terms to define his structural systems. Anchor = Foundation, Cage = Frame, Carlins = Purlins, Cowling = Roof, Ventilator = HVAC, Deck = Flooring, Mast = Stud, Gores = Roofing Shingles, and Skin = Walls and Windows.

[16] The following is a description of our examination condition criteria:

Excellent: No evidence of active deterioration. Minimal damages or evidence of previous deterioration. Exhibitable in present condition.

Good: No evidence of active deterioration. Minor damages resulting from "normal" events and conditions. Exhibitable with minimal treatment.

Fair: Some active deterioration. Obvious damages, but structurally stable overall. Treatment necessary for exhibit.

Poor: Rapid deterioration threatens object's overall integrity. Severe losses and damages - structurally unstable. Object may not be exhibitable. Extensive treatment required.

[17] Aluminum-copper alloys used in the Dymaxion Dwelling Machine include rolled aluminum sheets: 24ST, 24SO, 24STAL Alclad, R301-T, 24ST Pureclad, Duralumin, 24STAL, and 2024. Alclad & Pureclad are trade names that refer to a thin layer of 100 percent aluminum that coats the outer surface to inhibit corrosion. The aluminum alloys used were specified for airplane construction and not housing construction. Moreover, the alloys were not as resilient to corrosion as housing construction alloys (52S-O) made with magnesium.

[18] For aluminum alloys, 1930s through 1940s, see Douglas B. Hobbs, *Aluminum* (Milwaukee, Wisconsin: Bruce Publishing Co., 1938), 80. For ALCOA Aluminum alloys produced at the end of World War II until 1950, see *ALCOA Aluminum and its Alloys* (Pittsburgh, Pennsylvania: Aluminum Company of America, 1950). For aluminum alloys produced after 1950, see John Peter, *Aluminum in Modern Architecture,* two volumes (Louisville, Kentucky: Reynolds Metals Company, 1957); Kent R. Van Horn, *Aluminum,* Volume 2 (Ohio: American Society for Metals, 1967); Henry J. Cowan and Peter R. Smith, *The Science and Technology of Building Materials* (New York, New York: Van Nostrand Reinhold Company, 1988), 85-90; and *Aluminum and Aluminum Alloys* (Metals Park, Ohio: American Society of Materials, Inc., 1994)

[19] *Care of Aluminum* (Washington DC: The Aluminum Association, Inc., 1983), 9-12.

[20] Two major forms of aluminum corrosion are galvanic: the process of dissimilar substances (as metals) acting together as an electric source, separating the material, when in contact with water. The other is filiform, a wormy type of corrosion that occurs on the surface of aluminum under lacquers and varnishes. For further description of galvanic and filiform corrosion, see Martin E. Weaver, *Conserving Buildings: A Guide to Techniques and Materials* (New York, New York: John Wiley & Sons, Inc., 1993), 176-118.

[21] For a list of suggested cleaners and detergents see *Care of Aluminum,* 22-23.

[22] Other methods and techniques that we tested but decided not to use for tar coating removal and general surface cleaning include application of liquid nitrogen and particle blasting using corn cobs, baking soda, and plastic.

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News Film Library, Instructional Services Center, University of South Carolina, Columbia, South Carolina 29208

Shaw Collection, March of Times newsreels 1929-1948

MovieTone News Collection 1919-1963

Feltner Collection of Newsfilm 1919-1963

Sherman Grinburg Film Libraries, Inc., 630 Ninth Avenue, New York, New York 10036-3787

Paramount News Library 1927-1957

ABC News 1963-present

Sherman Grinburg Film Libraries, Inc., 1040 North McCadden Place, Hollywood, California 90038-2486

Pathe News Library 1898-1954

Motion Picture and Video Branch, United States National Archives, 8601 Adelpi Road, College Park Maryland 20740-6001

Universal News Collection 1929-1967

Paramount News Collection 1940-1957

Movietone News Collection 1959-1963

News of the Day Collection 1963-1967

Margaret Herrick Library, Academy of Motion Pictures, 33 La Cieniga Boulevard, Los Angeles, California

Archives and Index to American Films

Trade Associations and Twentieth Century Building Material Collections

ALCOA (Aluminum Company of America) Corporate Library, 1725 ALCOA Building, Pittsburgh, Pennsylvania 15219

Collections consist of materials supporting company products from the 1920s to the present.

The Aluminum Association, Inc., 900 19th Street, NW, Suite 300, Washington DC 20006

Trade association for the aluminum industry in the United States. The association has an extensive technology and materials science archive. The association publishes written and audiovisual materials concerned with aluminum production and usage.

Buckminster Fuller Institute, 2040 Alameda Padre Serra, Suite 224, Santa Barbara, California 98103

Chronofile Archives include Fuller's research of aluminum uses for housing.

B.F. Goodrich Company Archives, Pierce Library, University of Akron, Akron, Ohio 44325-1072

Archives include company history as well as rubber and laminated product descriptions.

Dow Chemical Collection, Post Street Archives, 205 Post St. Midland, Michigan 48640

Archives include information concerning plastic and aluminum-magnesium building products.

Fay S. Lincoln Collection, Pennsylvania Historical Collections and Labor Archives, Pattee Library, Pennsylvania State University, University Park, Pennsylvania 16802

Extensive photographic collection of buildings and interiors, primarily of the New York City area, from 1925 through 1960.

General Electric Company Archives, Hall of History Foundation, Building 28, Room 310, 1 River Road, Schenectady, New York 12345

Collections include history of GE products, development research, and trade publications. The General Electric Company was very interested in the idea of the "all electric home" in the 1920s and 1930s and conducted extensive research concerning modern building materials.

History of Technology Archives, Hagley Museum and Library, PO 3630, Wilmington, Delaware 19807

Collections concerning the history of technology including manufacturers trade catalogs. As well, the Hagley Library is the depository for the Du Pont Corporate Archives. The Du Pont collection includes history and technical descriptions of Neoprene, Lucite (acrylic resin), Nylon, Fabrikoid (imitation leather), Plastacele (cellulose acetate), and Pryalin (cellulose nitrate) building products.

Henry Ford Museum & Greenfield Village, Design History Archives, PO Box 1970, Dearborn, Michigan 48121-1970

Industrial archives concerning twentieth-century building materials include:

Mel Boldt Collection - Consumer Electronics and Appliances

Herman Miller - Furniture and Office Systems 1923-1987

Stickley Furniture Co. - 1879-1978

Industrial Designers Society of America (IDSA), 1142 Walker Road, Great Falls, Virginia 22066

Trade association that focuses on current industrial design and has a strong interest in preserving twentieth century design collections.

Libbey-Owens-Ford Glass Company Archives, Ward M. Canaday Center, William S. Carlson Library, University of Toledo, Toledo, Ohio 43606

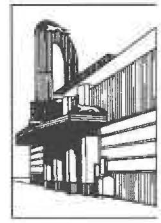
Collection includes company and product histories as well as building projects using significant amounts of glass.

Charles Martin Hall Collection of Aluminum History, Oberlin College, Oberlin, Ohio

Collection includes Hall's personal papers concerning the manufacturing of aluminum and its varied uses, 1882-1915.

University of Illinois at Urbana-Champaign, School of Architecture/Building Research Council, One East Saint Mary's Road, Champaign, Illinois 61820

Formed in 1944 as the Small Homes Council, this organization has and currently specializes in light frame building research. Archives include Minimum Property Standards Research, Building Research Advisory Board, and Housing and Home Finance reports.



Structural Metals: Use and Misuse of Weathering Steel

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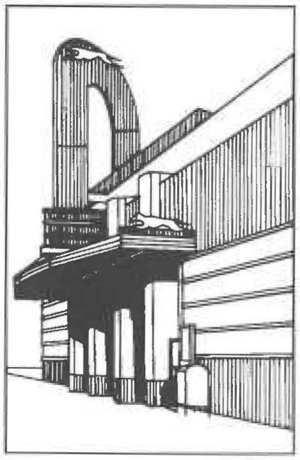
Abstract

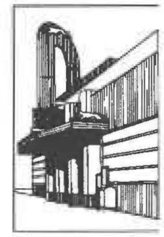
Weathering steels, when properly used, are a virtually maintenance-free building material. Developed in the 1930s, these steels, often better known under their trade name Corten, were used initially for railroad cars. Eero Saarinen was the first architect to explore the possibilities of an exposed steel structure when he designed the John Deere Building in 1961. The building was a deeply-colored brown, red, and purple, and had a texture that couldn't be reproduced artificially. It was an instant winner, and it attracted imitators.

Every architect is not a Saarinen and the characteristics of weathering steel must be understood - in particular, the nature of the formation of the protective coating - to obtain desirable qualities and avoid problems. Successful use of weathering steels for exterior frames and facades requires the selection of appropriate materials, consideration of the environmental exposure, and most of all proper detailing. The steel must be exposed to alternating wet/dry cycles in order to develop its protective patina. The design should avoid non-draining details, crevices, and unprotected faying surfaces. Joints between and within components should have watertight seals. Areas of steel with prolonged exposure to moisture and dampness should be protected with an appropriate coating.

The John Deere Building and many other imposing structures confirm that when weathering steel is used in the right environment, properly designed, and carefully detailed, then a weathering steel building can be a beautiful piece of architecture. However, the condition for achieving a successful design with weathering steel is that the material is not misused. Inappropriate environments and incorrect detailing may result in excessive corrosion and premature failure.



The Concrete Atlantis



The Deterioration, Repair, and Replication of Cast Stone

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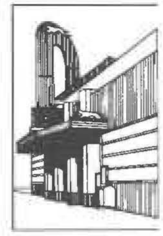
Abstract
Cast stone is precast concrete that uses molded shapes, decorative aggregates, tinting compounds and tooling to imitate natural stone. Nineteenth-century antecedents to contemporary cast stone - Ransome Stone, Coade Stone, and Frear Stone, among others - pioneered artificial stone technology. It was only with developments in the portland cement and concrete industries at the end of the nineteenth century and in the early decades of the twentieth century, however, that cast stone became widely accepted as an economical substitute for natural stone.

The best cast stone can rival natural stone in longevity. It is subject to deterioration, however, through failure of the aggregate or of the cementing matrix and deterioration of iron or steel reinforcement used in its manufacture. Depending upon the extent and nature of its failure, cast stone may require repair or replacement.

Where installations have suffered mechanical damage or isolated spalling from deterioration of reinforcement, composite repair methods such as those used for stone masonry are also applicable for the repair of cast stone. For repairs to damaged cast stone to be successful, both the cement matrix color and the aggregate size and coloration must match that of the original unit.

Individual cast stone units that are subject to repeated wetting, such as copings, railings, and balusters, and that exhibit severe failure due to spalling or extensive reinforcement deterioration may require replacement with new cast stone. The variables involved in manufacture are considerable. In addition to the cement coloration and aggregate match considerations previously mentioned, other concerns in the manufacture of replacement cast stone include air bubbles, surface cracking or checking, and susceptibility to frost damage.

This presentation outlines the twentieth century development and use of "manufactured" stone and discusses its modes of deterioration. The presentation establishes a methodology for the design professional who must specify repair or manufacture of cast stone, both for replication of existing installations and as a substitute for natural stone.



Architectural Precast Concrete

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Architectural precast concrete may be defined as any precast concrete unit of special or, occasionally, of standard, shape that through application, finish, shape, color, or texture contributes to the architectural form and finished effect of the structure; units may be load-bearing or non-load-bearing and may be conventionally reinforced or prestressed. Hardware for connection to the structure may consist of structural steel shapes, bolts, threaded rods or reinforcing bars. Generally, connections are bolted or welded.[1]

Surface finish techniques of water washing and brushing, bush-hammering, sandblasting, and acid etching were initially developed for cast-in-place concrete, as was obtaining colored surfaces by means of pigments and special colored aggregates.[3] The type of form-applied retarder currently in use was developed in 1954 by Sika Chemical Corporation.[4]

The first documented modern use was of architectural precast concrete was in the Cathedral Notre Dame du Haut in Raincy, France, by Auguste Perret in 1923 - though used just as screen walls and infill in an otherwise in-situ concrete solution.[2] The Depression years followed soon after, and then the cataclysm of World War II. It was not until the end of world conflict that the architectural use of precast concrete began to flourish.

Two buildings of the late 1930s, however, made notable uses of large size precast concrete cladding panels: first, the White Horse Barn at the 1937 Minnesota State Fair, with panels fifteen feet long by seven feet high by six inches thick, cast with a smooth finish, cured after seven days in steam-filled rooms, and fixed by edge-casting into cast-in-place structural concrete.[5]

The second use was in 1938 for administration buildings at the David W. Taylor Model Testing Basin, near Washington DC.[6] Here panels 2-1/2 inches thick and up to ten feet by eight feet in area were used as permanent forms for cast-in-place walls. The latter project is of further significance in light of continuing postwar developments in precast concrete technology, as the first use of the Mo-Sai manufacturing technique.

In 1932, John J. Earley and his associates at Earley Studio, Rosslyn, Virginia, started work on producing exposed aggregate ornamental units for the Baha'i Temple in Wilmette, Illinois.[7,8,9] This is one of the most beautiful and delicately detailed precast concrete projects in the United States. The panels are white concrete with exposed quartz aggregate. Lack of building funds postponed exterior precast concrete completion until 1943. The interior architectural ornamentation was completed between 1949 and 1951.

The Dextone Company, New Haven, Connecticut, was associated with John Earley on the David W. Taylor Model Testing Basin,[6] which was the first job (1937) where the exposed aggregate large area slab was adapted to serve as exterior form and pre-inspected facing for reinforced concrete building construction. Earley had patented the idea of using step (gap) - graded aggregate to achieve uniformity and color control for exposed aggregate work.[10]

Working from this background, The Dextone Company refined and obtained patents and copyrights on the methods under which the Mo-Sai Associates (later Mo-Sai Institute, Inc.) operated[11]. The Mo-Sai Institute grew to com-

prise a number of licensed manufacturing firms in various parts of the United States, and its public relations and advertising activities, reflecting technical achievements, came to be a major factor underlying general acceptance of architectural precast concrete. The surface finishes produced by the Mo-Sai process were dense, closely-packed mineral aggregate with a minimum of cement/fines matrix: hence the derivation of the name Mo-Sai from the resemblance to mosaic.[12]

In 1958 a new panel casting method was introduced in the United States under the name of Schokbeton (shocked concrete) and a number of franchised plants were established.[13] The machinery used in this method was patented in Holland in 1932. The process is mainly a means of consolidating a no-slump concrete mixture by raising and dropping the form about 5/16 inch some 250 times per minute. This contrasts with conventional methods of consolidation by means of high frequency and low amplitude vibration. Although the production of large precast panels by this method was relatively new, small concrete units had been produced in the past on so-called "drop tables" which followed the same technique without the refinement of modern machinery. Depending on the cement content the shocking technique produces compressive strengths of 3,000 to 4,000 psi after twenty-four hours and up to 10,000 psi at twenty-eight days.

Architectural precast concrete usage initially was complicated by the lack of mobile cranes and other efficient material handling equipment. Because of the lack of this equipment and competition from metal and glass curtain-walling, precast concrete was comparatively slow to develop, and the record of its eventual rise to parity, even in places its dominance, is properly that of the 1960s. Reasons for this expanding usage were improved methods of production, better handling and erecting equipment, and development of new techniques and materials. Probably the greatest factor, however, has been the realization that precast panels provided a pleasing variety of surface textures and patterns and exterior designs that generally could not be accomplished as economically in other materials. There were a number of pioneering early postwar uses of precast concrete in architecture, though they were otherwise of limited significance. They included dormitory units at the University of Connecticut (1948) based on loadbearing wall panels; an eight-story office building (1949) in Columbia, South Carolina, with window-wall cladding panels (erected by hand-winch); and a six-story office building in Miami (1951) where four-inch thick precast panels were suspended from the soffit of a cantilevered cast-in-place floor slab.[2,24]

The Hilton Hotel, Denver, Colorado, completed in 1958-1959, was one of the early significant uses of window wall panels fixed to a structural frame. The Police Administration Building, Philadelphia, Pennsylvania, completed in 1962, made history as one of the first major buildings to utilize the inherent structural characteristics of architectural precast concrete. Its five foot wide, thirty-five foot high (three-story) exterior panels carry two upper floors and the roof. This structure was an early model for the blending of multiple systems (precasting and post-tensioning) into one building.[1]

Cleaning

Cleaning should preserve the physical integrity of the surface and substrate of the precast concrete.[14,15] This involves removing all harmful and unsightly soilage without adversely affecting the precast or leaving harmful residual materials such as soluble salts. Therefore, both the substrate and contaminants should be evaluated.

There is no single prescription for the cleaning of precast concrete. A tremendous variety of materials may be used in concrete, and each building is exposed to a unique set of ambient conditions. Both laboratory and field tests of proposed cleaning systems must be conducted to determine the effect on concrete surfaces. Before proceeding with the cleaning, a small inconspicuous area of at least one square yard should be cleaned and checked to be certain that there is no effect on the concrete surface finish or adjacent materials. The effectiveness of the method on the sample area should not be judged until the surface has dried for at least one week. If at all possible, cleaning of concrete should be done when the temperature and humidity allow rapid drying. Slow drying increases the possibility of recurring efflorescence and discoloration.

A suggested order for testing appropriate procedures for the removal of dirt, stains and efflorescence (beginning with the least damaging) includes the following:

(1) Dry scrubbing with a stiff fiber (nylon) brush;

(2) Wetting the surface with water and vigorous scrubbing of the finish with a stiff nylon fiber brush followed by thorough rinsing of the

surface with clean water; low-pressure water spraying (water misting either intermittent or continuous), moderate-to-high pressure water washing (300 to 1,500 psi) with cold or heated water;

(3) Chemical cleaning compounds such as detergents, acids, or other commercial cleaners used in accordance with the manufacturer's recommendations. If possible, a technical representative of the cleaning product manufacturer should be present for the initial test application to ensure its proper use; or,

(4) Dry or wet abrasive blasting, using sand, ferrous aluminum silicate, industrial baking soda, or other abrasives, may be considered if this method was originally used in exposing the surface of the unit. However, abrasive blasting will generally have a harmful effect on the surface of the concrete. The aggregate surface will be dulled, sharply fractured aggregate surfaces rounded, and the cement matrix eroded possibly causing loss of exposed aggregate on the surface. For information on removing specific stains from concrete, the reference cited in Note 17 should be consulted.

Restoration

Prior to undertaking restoration, an evaluation of the existing condition of the structure is often necessary to obtain information on the extent of deterioration and to establish the cause and significance of such deterioration. This information can only be obtained through a systematic review of service records and the original design and construction details of the structure. Following such a review, a detailed field investigation should be planned. Where records are incomplete or unavailable, intelligent observation and sound judgment should be applied in planning a field investigation program. The program should include visual examination, nondestructive testing, and collection of specimens for laboratory testing. A visual inspection alone is not generally sufficient to assess adequately the extent of deterioration and develop proper restoration procedures. For guidance on conducting a detailed investigation prior to restoration, ACI Report 364.1R[18] contains tables correlating appropriate evaluation and testing procedures with the investigation of specific physical conditions.

Surface deterioration of architectural precast may occur from the movement of water, chemical deposition, atmospheric staining, erosion, organic growths, cyclic freeze/thaw action, trapped moisture, scaling, joint deterioration, efflorescence, and metal corrosion and resultant rust stains or delamination or spalled concrete. The verticality of wall units seldom allows concrete to reach the saturation point to create freeze-thaw expansion pressures. Therefore, the lack of air entrainment in concretes cast before 1940 should not be a major concern. However, where horizontal areas allow water or snow to accumulate, freeze-thaw damage could occur. Also, over time, metals with inadequate cover may corrode and spall concrete, if the concrete retains moisture.

Restoration work requires expert craftsmanship and careful selection and mixing of materials if the end result is to be structurally sound, durable, and aesthetically pleasing. Repairs can be made at any age of the concrete provided suitable mixtures are used, proper bonding is attained, and reasonable curing is possible. Since the techniques and materials for restoring architectural precast are affected by a variety of factors including mix ingredients, final finish, size and location of damaged area, temperature conditions, age of member, surface texture, etc., precise methods of repairing cannot be detailed. See the reference cited in Note 19 for guidance on repair techniques and materials.

Trial mixes are essential to determine exact quantities for the repair mix. This is best determined by making a series of dark- to light-colored trial repairs on the project all on the same day. Selection of the appropriate color-matched mix should begin after the trial repairs have been allowed to cure a minimum of seven days, or preferably fourteen days, followed by normal drying to twenty-eight days. This is important because curing and ultraviolet bleaching of the cement skin have an effect on the finished color.

Adequate curing methods for repairs should be implemented as soon as possible to ensure that the repair does not dry out too quickly and cause it to shrink away from the existing concrete. The repair area should be moist cured for a minimum of three days with seven days preferable.

Since repairs will have differences in densities and cure at a faster rate than the surrounding concrete and be exposed to different curing environments than the already cured unit, it may be necessary to alter the color by blending portland cements or the ratio of cement to aggregate from the original mix proportions, to

provide the same general color as that in the rest of the surface. Sometimes other aggregates may be used to obtain uniformity.

Bonding agents such as epoxies, polyesters, and water-resistant latexes (ASTM C1059, Type II) may be desirable for large repairs. Latex bonding agents should generally not be used integrally with the repair material, since a different texture, color, or appearance will be apparent when the repair material is wet, or the repair may even change to an objectionable color. The bonding agent should be neatly applied to the dry surface of the repair area and allowed to dry to a tacky-sticky condition before applying the repair mix.

If cracking has occurred, and if repair is required for the restoration of structural integrity or aesthetics, the cracks, ranging in width from 0.003 inch to 0.25 inch and with a depth less than 12 inches, may be repaired by the injection under pressure of a low viscosity, high modulus, 100 percent solid two-component epoxy conforming to ASTM C881. Type, grade, and class should be chosen to satisfy job conditions and requirements.[21] The system should be capable of bonding to wet surfaces, unless it can be assured that the crack is dry. Care should be taken to select an epoxy color (amber, white, or gray) that most closely matches the concrete surface. The general procedures involved in epoxy injection are discussed in ACI 503R,[22] but care is necessary to ensure crack line is unobtrusive.

After all repairs have been completed, the repairs should be coated with a silane or dilute (two to three percent solids) solution of an acrylic sealer to minimize moisture migration into the repair concrete. The acrylic sealer should not stain the concrete. Even with the proper consolidation the repair is more porous than the original hardened concrete and will need this dilute sealer application.

All cleaning, repairs and remedial work should be documented and kept in job record files for further use, if necessary.

Connection Corrosion

If water gets behind the architectural concrete cladding, either through moisture infiltration (panel or joints) or condensation, corrosion of the connections may occur. New galvanized, epoxy-coated or stainless steel plates or angles can be installed with expansion or chemical anchors[23] inserted into drilled holes in the hardened concrete. For connection reliability, the importance of correct installation and quality control cannot be overemphasized. The holes must be drilled straight, deep enough, and with the proper diameter, and must be cleaned out. The bolts must be tightened to the recommended torque, sometimes requiring pneumatic impact wrenches. The minimum distance to the edge of the concrete and spacing between bolts should be based on the anchor manufacturer's recommendations. Care should be taken in placing the expansion anchors in the predrilled holes, so that expanding the anchor in the direction of the edge will be avoided. A knowledgeable precast engineer should determine the movement capability of the new connections to avoid restraint and possible cracking.

Replacement

Erosion or other surface deterioration may require production of replacement members with or without an accurate model to copy. Techniques are available using elastomeric materials to produce accurate formliners for production purposes. Also, a photogrammetric survey can locate any point on a surface in three dimensions within one-eighth of an inch, and with a computer, an accurate model may also be produced. Production techniques are discussed in the reference cited in Note 19.

Clear Surface Coatings

Sealers or clear surface coatings may be applied to improve weathering qualities in urban or industrial areas. (A sealer may reduce attack of the panel surface by airborne industrial chemicals or to facilitate cleaning of the surface.) The use of a sealer will also reduce the absorption of moisture, thereby minimizing the wet-dry cycle and the subsequent migration of water and salts to the surface.

Proper application, following sealer manufacturer's instructions, depends on qualified operators and possible expensive pretreatment of the precast concrete units. The application limitations of sealers with respect to timing, ambient temperatures, moisture content of the concrete, method, and rate of application should be fully investigated before choosing a particular type or supplier.

Any sealer used should be guaranteed by the supplier or applicator not to stain, soil, darken or discolor the finish. Also, some sealers may cause joint sealants to stain the panel surface or affect the bond of the sealant. The manufacturers of both the sealant and the sealer should be consulted before application, or the materials

specified should be pretested before application.

Jobsite-applied surface coatings should not be applied until all repairs and cleaning have been completed.

The type of solvent used in sealers, as well as the solids content, can affect the resulting color of the panel surface. Thus, neither the type nor the source of sealer should be changed during the project. Sealers may consist of the methyl methacrylate form of acrylic resins, which have a low viscosity and high solids content, or silane products based on monomeric alkylaloxysilane (AS) or oligomeric alkylalkoxysiloxane (OAS). Generally, sealers having a high solids content tend to darken the panel surface. The amount of color change depends primarily on the type of material in the sealer and the concentration, as well as the porosity of the surface. The active ingredient of the sealer must be chemical-resistant to the alkaline environment of the concrete. Also, sealers should be evaluated on how well they penetrate panel surfaces that vary in absorption and texture. The new generation of penetrating sealers, generally silanes or siloxanes, develop their water repellent ability by penetrating the surface to depths of 1/4 inch, reacting with the cementitious materials in the concrete and making the concrete hydrophobic. The penetrating ability of the sealer system depends on the molecular size of the active ingredients, the viscosity of the system, and the solvent-carrying system.

Notes

[1] *Architectural Precast Concrete*, first edition, MNL 122 (Chicago, Illinois: Precast/Prestressed Concrete Institute, 1973).

[2] A.E.J. Morris, *Precast Concrete in Architecture* (The Whitney Library of Design, 1978).

[3] W.M. Walter Smith, "Ornamental Treatment of Concrete Surfaces," *American Architect* C1 (24 January 1912): 33.

[4] K. Precht, *Exposing of Surface Aggregate on Prefabricated Facade Concrete*. Sika Chemical Corp.: "50 Years of Structural Waterproofing and Concrete Techniques" (1960), 311-320.

[5] *Architectural Concrete* A, no. 1 (Portland Cement Association, 1938).

[6] Hugo C. Fischer, "The Navy's New Ship Model Testing Plant" *ACI Journal* (Detroit, Michigan: American Concrete Institute, April 1939): 317-336.

[7] John J. Earley, "The Project of Ornamenting The Baha'i Temple Dome," *ACI Journal* (Detroit, Michigan: American Concrete Institute, June 1933): 403-411.

[8] John J. Earley, "Architectural Concrete of the Exposed Aggregate Type," *ACI Journal* (Detroit, Michigan: American Concrete Institute, March-April 1934): 251-278.

[9] Frederick W. Cron, "The Man Who Made Concrete Beautiful," (Ft. Collins, Colorado: Centennial Publications, May 1977).

[10] John J. Earley, United States Patent No. 1,376,748, issued 3 May 1921.

[11] S. Ember, "Design Freedom With Exposed Aggregate Architectural Concrete Slabs," *Concrete* (September 1949): 15-19.

[12] Typically, two-inch thick Mo-Sai panels were made up to 100 square feet either as veneer for masonry construction or form and facing for poured concrete. All panels were cast face down, pneumatically vibrated, and incorporated galvanized welded mesh. The face mixes were always composed exclusively of either granite or quartz aggregates, and the fines were of the same material. Average mix proportions approximated one part of fines to seven parts of two or more sizes of coarse material. Aggregate-cement ratio approximated 4:1, while the water-cement ratio in a very damp mix was as great as 5:1. Shop handling conditions made possible the dry mixes, and these in turn yielded crushing strengths of a minimum of 7,000 psi and absorption less than seven percent under five hour boiling. Backup mixes were composed of washed and screened concrete sand plus crushed stone, and were placed monolithically with the face material. Once cast, the entire plastic mass of the panel was pneumatically vibrated to insure compacting of material and to bring to the exposed back face any excess moisture. This was immediately evacuated by mechanical means and through the use of hygroscopic materials.

After casting, panels were allowed to cure for 24 hours in the molds, and were then removed and stacked in a vertical position on easels for a further curing period of several days. Final finishing, usually acid etching, took place just before shipment. Dextone was also producing polished concrete panels in 1949.

[13] Ralph Ironman and Richard S. Huhta, "Shocked Concrete Comes to the States," *Concrete Products* (December 1960): 29-32.

[14] Deborah Slaton, Stephen J. Kelley, and Harry J. Hunderman, "Cleaning Historic Facades," *The Construction Specifier* (July 1994): 55-61.

[15] David Hadden, "Cleaning Restoration of the Baha'i House of Worship," *Concrete International* (September 1992): 44-47, 51.

[16] It is important, whenever a cleaning compound or acid solution is used, that the areas to be cleaned are thoroughly saturated with clean water prior to application of the cleaning solution. This prevents the solution from being absorbed deeply into the surface of the concrete. The cleaned area should be thoroughly rinsed with clean water. Ph paper should be applied to a dampened concrete surface to ensure that surface is neutral. Cleaning solutions should not be allowed to dry on the face of the panels. Residual salts can flake or spall the surface or leave difficult stains. Care should be taken to protect all adjacent corrodible materials, glass, or

exposed parts of the building during acid washing. A strip-off plastic that is sprayed-on can be used to protect glass and aluminum frames.

Care should be taken to use dilute solutions of acid to prevent surface etching that may reveal the aggregate and slightly change surface color and texture of a panel and, thus, affect the appearance of the finish. The cleaning system should not bleach or darken the surface. The entire panel or facade should be treated to avoid a mottled effect. Also, long-term side effects have to be determined from previous projects.

[17] *Removing Stains and Cleaning Concrete Surface*, IS124T (Portland Cement Association, 1988).

[18] ACI Committee 364, Guide for Evaluation of Concrete Structures Prior to Rehabilitation," Report 364.1R, *ACI Materials Journal* (Detroit, Michigan: American Concrete Institute, September-October 1993): 479-498.

[19] *Manual for Quality Control for Plants and Production of Architectural Precast Concrete*, MNL 117, third edition (Precast/Prestressed Concrete Institute, 1996).

[20] For shallow repairs it may be necessary to remove large sand particles that may hinder working the repair mix into the repair area. For smooth surfaces, concrete sand may be too coarse to use in the mortar. Coarse sand will impart coarse grain texture to the concrete and this will show up very conspicuously against the smooth surrounding concrete. Therefore, limestone or marble dust should be added to the sand or a fine silica sand substituted. These fine aggregates also increase the water requirements of the mortar and produce a whiter surface. In large areas requiring repair, the coarse aggregate would normally be in the repair mix. If surface texture is sandblasted, then coarse aggregate larger than 1/4 inch should be blasted prior to use in the repair mix.

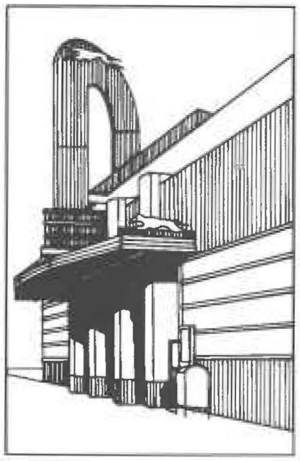
[21] Cracks wider than 0.25 inch should use a gel type resin system incorporating a mineral filler or a long pot-life material. Some cracks extending downward from nearly horizontal surfaces may be filled by gravity. The minimum width of a crack that can be filled by gravity is a function of the viscosity of the material.

[22] ACI Committee 503, "Use of Epoxy Compounds with Concrete," Report 503R-93, *ACI Manual of Concrete Practice*, Part 5 (1994).

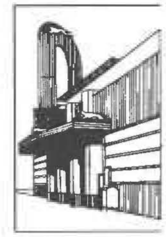
[23] Chemical anchors (resin capsule or epoxy anchors) could be also considered for this application or for heavy loads. Because of full depth bonding, resin capsule anchors are less likely to work loose under shock or vibration conditions than expansion inserts. However, chemical anchors may degrade due to creep at temperatures in the 140 to 150 degrees F range. Such temperatures are readily experienced in warm climates, particularly in facade panels with dark aggregates. Also, chemical anchors may not be allowed in fire rated connection assemblies. Manufacturers' recommendations for installation must be followed.

[24] J.L. Peterson, "History and Development of Precast Concrete in the United States," *ACI Journal* (Detroit, Michigan: American Concrete Institute, February 1945): 477.

[25] American Concrete Institute, Detroit has a number of publications on repair of cracks and concrete surfaces that are of general interest.



The Inside Story



The Restoration of Zenitherm, Absorbege, Cushocel, and Silent Ceal

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When four proprietary twentieth-century materials and systems were encountered during the design and planning phase of the restoration of the New Jersey State House Annex in Trenton, New Jersey, work began to identify them and determine appropriate treatments. The four items are Zenitherm, an imitation stone used on walls; Absorbege, an acoustical board material used on a ceiling; Cushocel, a felt and membrane acoustical ceiling and wall system; and Silent Ceal, an acoustical ceiling system. All of these materials were installed in the 1928 and 1931 State House Annex as part of the original construction.

Identification was carried out through reference to the original drawings for the building and through research in *Sweet's Catalogue*. Determination of appropriate treatments was carried out in consultation with materials analysts. And in the case of all four, the trial of these methods in a major construction setting led to modifications of the treatments, as did construction disasters.

Zenitherm

The original finish schedule for the State House Annex identified Zenitherm as the wall finish in several public corridors and museum spaces, so it was just a question of finding out what it was. *Sweet's Catalogues* and individual trade catalogues for the Zenitherm Company provided information about the composition of the material and installation details. All of this information coincided with the information gathered by removing pieces of Zenitherm and through material analysis. The composition was indicated to be "magnesite," a combination of magnesium oxychloride, wood fibers, and asbestos. Testing has indicated the presence of asbestos in some of the Zenitherm, and the wood fibers were visible to the naked eye. The catalogues also showed installation with nails over wood furring or solid sheathing, and both conditions were present in the Annex.

The deficiencies in the Zenitherm were primarily soiling, deterioration of pointing, and mechanical damage such as gouges, chips, abraded corners, etc. There was also missing Zenitherm that needed to be reproduced and replaced.

For cleaning, both solvents and detergents were tested. The Zenitherm literature promised that it could be cleaned with soap and water, and true to this claim, the detergent Ion 417 was selected as the most effective cleaner.[1] After cleaning, the treatment program called for coating both to restore the original sheen, which resembled honed stone, and to facilitate future cleaning by building maintenance personnel. The project team believed that some of the deterioration of the surface of the Zenitherm was the result of previous inappropriate cleaning methods and materials. Guardsman Satin Waterborne Topcoat was selected after testing several products and sheens. This product, primarily used on woodwork, complies with New Jersey's VOC regulations.

A non-sanded tile grout in a color that matched the original "Zenitherm Pointing Compound" was selected for repointing. The exact composition of the original material is not known. Grout tinted to match the surrounding material was selected for filling losses also. Missing panels were to be reproduced in a plaster-based material.

Treatment of the Zenitherm began according to the methods outlined above. The first hitch came with the attitude of the insurance companies of the contractors bidding on the restoration work. Zenitherm is an ACM - an asbestos containing material. The amount of asbestos is small, however, and it is not friable, leading the Department of Community Affairs (DCA), the agency that regulates asbestos abatement in New Jersey, to determine that it could remain in place and be maintained by building personnel in the same way as vinyl asbestos floor tile. DCA also reviewed the specified cleaning methods and determined that they would not release fibers, and therefore did not need to be done under controlled conditions or under their regulation. Unfortunately, the insurance companies of the contractors did not agree, and neither did the union representatives. Anything with asbestos is off limits. The restoration of the asbestos-containing Zenitherm had to be taken out of the Interior Stone Restoration contract, and bid as a separate package. The cleaning was ultimately done by a principal of a metal and stone restoration company working with one assistant to limit liability. [2] The area was sealed off, and the two men wore air monitors that were checked regularly by an environmental engineering company. Asbestos levels were elevated only once, when pipe fitters in the basement blew fibers from a disturbed steam chase floor openings into the room above. Once the cleaning was complete, the area was re-opened and pointing, replacement, and sealing continued.

The Ion 417 worked well for removing soil from the Zenitherm, but it required a substantial amount of rinsing, more than the testing had indicated. Several rinses were required to remove a gray residue. The additional water lead to efflorescence, which was successfully removed by brushing after the Zenitherm had dried out. Drying was inhibited by leaks in the roofing at the edges of the room, which kept the walls damp throughout the winter. The problem was further compounded by a lack of heat for part of the winter as a result of other construction sequencing. Eventually, the roof leaks were fixed, the heat was turned on, and the walls did dry, so coating could proceed. But now the satin coating, which had looked so good in samples on a number of individual panels, looked very shiny on a large expanse of wall. To dull the sheen, the contractor rubbed the entire area down with a wet Scotchbrite, and now the sheen matches quite well an undisturbed area exposed by the removal of an original wall-mounted directory.

Reproducing Zenitherm required a considerable amount of trial and error to achieve the proper textures and colors.[3] The texture was created by adding an activating ingredient to the plaster to make the fissures and bubbles and by adding wood fibers. Determining the proper colors turned out to be quite difficult, because the color of Zenitherm changes as the humidity changes. The plaster material does not have this property, and so the samples were checked at several times of the year to verify that the color would be a good match. The color is also affected by the species of wood used for the fibers. One sample batch made with poplar shavings had a very pronounced green cast. Reproduction Zenitherm was installed in a manner similar to the original - it was secured to the backing, original wood sheathing or furring, or new metal furring, with countersunk screws, and the holes pointed up.

Abosorbege

Absorbege is a wood fiber acoustical board material manufactured in the late 1920s and 1930s by the Acoustical Corporation of America, and installed in the New Jersey State House Annex in 1931 on the ceiling of the conference room of the Court of Errors and Appeals. The material was used as the background surface for a Jacobean style strapwork ceiling. The strapwork pattern was made by applying cast plaster ornament over the Absorbege, and the Absorbege, a relatively soft material, was indented to mimic the look of an ancient plaster ceiling. The ceiling was originally treated with an ochre paint and a brown glaze, to coordinate with the dark oak paneling and to enhance the overall look of "Olde England."

The Absorbege and Cushocel were identified by an entry in the 1932 *Sweet's Catalogue* list of installations for the Acoustical Corporation of America, "New Jersey State House, J. Osborne Hunt and Hugh A. Kelly, Architects."

The Absorbege was, at the start of construction, in very good condition, and the only treatment required was to repaint the ceiling to match the original finish. The original finish was exposed in some places, but it was determined that this would no be feasible on a large scale due to many coats of resistant latex paint.

Unfortunately, disaster struck at the beginning of the second winter of the restoration. As a

result of leaks in the temporary roof, approximately fifty square feet of the material fell off the ceiling, and approximately another two hundred square feet was damaged. As a temporary measure, the damaged areas were shored to prevent their falling as well, and a roof drain was installed through a ceiling light and out a window to prevent further damage.

The Absorbege is, in fact, only the top layer of an entire ceiling system severely compromised by the leaks (Figure 1). It was applied with an organic glue to one-half-inch plywood, which was attached with widely-spaced nails to a plaster substrate. The water delaminated the plywood and attacked the glues holding the Absorbege to the ceiling. In many cases, mold grew at the joint between the Absorbege and the plywood.

After the ceiling had dried, and the roof had been made tight, any remaining unsound material still attached to the ceiling was removed. Material was determined to be unsound if the bond between the Absorbege and the plywood was weak, or if the plywood was delaminated. As more of the ceiling was investigated, it turned out that in some areas Absorbege was well bonded to delaminated plywood. It was determined that this material would remain in place, but that the plywood would be refastened to the plaster with toggle bolts, and the heads patched with salvaged Absorbege. Where the entire system was removed down to the plaster, it would be replaced with new plywood and cast plaster panels to replicate the Absorbege. Consultation with the acoustician for the project indicated that this replacement would not adversely effect the acoustical properties of the room. The Absorbege is a fragile material, and little could be salvaged for re-use in large areas after it had either been pried off the ceiling or picked up off the floor. Salvaged material would be used for small areas of infill or patching.

In the end, after considering issues of matching and the extent of the removed material, one quarter of the ceiling was replaced (approximately three hundred square feet). This way seams, between existing Absorbege and replacement panels could be disguised, and the problems of matching the applied plaster strapwork minimized. The plaster panels were cast in molds made from an area of the ceiling in good condition. The only discrepancy between the samples and the ceiling came in the delineation of the strips. While the Absorbege was manufactured as large sheets, it has the character of narrow strips butted together. The strips show in the ceiling divided by very fine cracks. These cracks did not show up in the sample castings and were cut into the final panels after fabrication. The last step in the replacement process was recreating the glazed ochre finish over the whole ceiling.

Cushocel

Cushocel, another product of the Acoustical Corporation of America identified through *Sweet's Catalogue*, is a felt and membrane acoustical ceiling and wall treatment (Figure 2). The system is comprised of a membrane (an open-weave canvas) applied to a layer of felt about three-quarter-inch thick that resembles carpet pad. Sound waves pass through the canvas and are absorbed by the felt. The canvas was painted with water-based textured paint, preferably spray-applied, so that the final result resembled sand-finished plaster. Literature for a similar product manufactured by Johns-Manville recommended this system for churches and courtrooms; the rooms where it was used for ceilings and upper walls in the New Jersey State House Annex were courtrooms.

During the project planning stage, the Cushocel was determined to fit into three categories: material in excellent condition, which would be repainted; material that was severely water-damaged, which would be replaced with plaster and canvas; and material that had to be removed in order to place the massive amounts of ductwork and piping which were the main impetus behind the restoration project.

On the ceilings, the Cushocel was placed over plaster, but when the roof and mechanical systems leaked onto it, the entire system delaminated, and the felt pad expanded and deteriorated. Brown stains also leached out, making it easy to identify water damaged areas. On walls, Cushocel is placed over metal framing with no solid backing, and is generally in excellent condition.

Neither Zenitherm, Absorbege, or Cushocel is classified for flame spread, so a code variation had to be obtained to allow them to remain in place. For this reason, it was decided to replace the Cushocel, where required, with canvased plaster, which is a classified material, rather than spend a great amount of time and money undertaking flame spread tests. And again, the

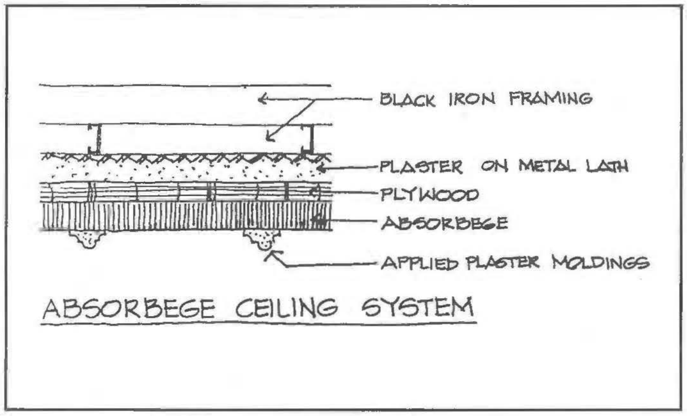

Figure 1. Absorbege ceiling system.

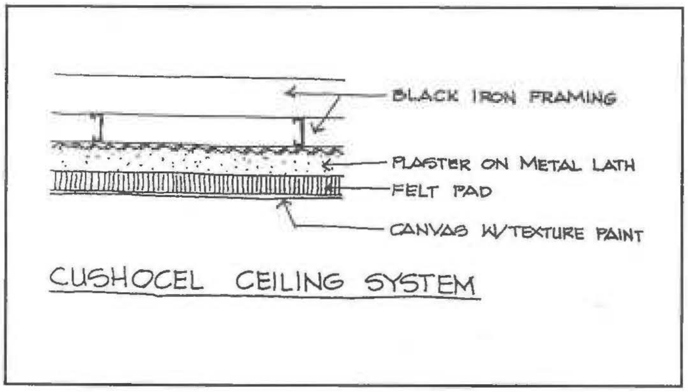

Figure 2. Cushocel ceiling system.

acoustician confirmed that substitution of plaster for the original acoustical material would not be a problem.

Restoration of the Cushocel at three simple vaulted ceilings went along smoothly. The disaster struck at one of the most elaborate ceilings in the building, a coffered segmental vault in the original courtroom of the Court of Errors and Appeals. In this room, the Cushocel was applied to a very thin burlap-reinforced plaster layer at the top of the coffer. Two things happened here: roof leaks from a new penthouse broke down the plaster and felt in a small number of coffers at one end of the room; and sheet metal workers and pipe fitters walked on the top of the ceiling throughout the room, caving in the plaster and bellying out the felt and canvas. Approximately twenty-five percent of the coffers were damaged. The extent of the damage was also increased when ceiling hangers were cut and not repaired when ductwork was installed, which permitted the ceiling to deflect further than it should.

The strategy in this room is to repair the Cushocel in place to the greatest extent possible. All broken plaster will be removed from the top. A form will be placed into the coffer to reposition the Cushocel in its proper placement. The top of the felt will be coated with a PVA-based bonding agent, and new plaster with fiberglass mesh reinforcing will be placed over the felt. The new plaster and mesh will lap over the edges of the coffers, providing a positive anchorage for the top of the coffer. Where the canvas

and felt are torn or deteriorated by water, they will be replaced with like materials. All ceiling hangers will also be resupported.

Silent Ceal

Another product of the Acoustical Corporation of America, Silent Ceal was identified from a chart in a 1932 reference book on architectural acoustics. This system was not included in the Acoustical Corporation of America's catalogue in *Sweet's*. Like Cushocel, it is a felt and membrane system (Figure 3). The felt in Silent Ceal is two to three inches of mineral wool, which is placed above the membrane, texture-painted canvas applied to perforated sheet metal.

This treatment is used in two original courtrooms with low-beamed ceilings where the finish ceiling is applied almost directly to the structural beams and slab. In order to install sprinkler piping and conduit, the steel and concrete beams had to be drilled, so the Silent Ceal had to be removed. The plan was to recreate the system exactly, with the substitution of metal framing for the original wood furring.

The first problem came with the attachment of the sheet metal to the framing - the flattest head screw available telegraphed through the canvas, so alternate fastenings had to be explored. A high-performance tape with an extremely high adhesive strength, used in the aircraft industry for metal to metal attachment, seemed very promising. A sample was provided by 3M, but it turned out to be impossible to remove enough of the oils from either the metal studs or the perforated metal to get a good bond. Another option, inserting fire-treated wood blocking in each metal stud and attaching the metal with roofing nails (similar to the original system) was determined to be too costly. By this time, an additional problem had also surfaced. The same oils that kept the tape from adhering to the sheet metal also kept the canvas from adhering. So rather than ending up with a lumpy-looking ceiling with peeling canvas, the system was reconstructed with gypsum wallboard covered with canvas and texture paint. From within the room, this construction looks exactly like the original system.

In dealing with these proprietary and currently little known materials, the methodology of identification followed by investigation and testing to determine a treatment was followed. With the proliferation of proprietary materials encountered in restoration of buildings of the twentieth century, this sort of work must be repeated over and over. Unlike traditional materials, many of these new materials were very short lived - Cushocel was probably produced for less than ten years, and felt and membrane systems overall were in use for not much more than ten years. Even Zenitherm, one of the longer-lived materials, was only available for about twenty years. The result of this rapidly changing marketplace is a huge number of varied materials, many of which will require the same sort of attention given to traditional materials. As more of these materials and systems are identified and studied, a greater base of information will be available to help avoid the problems and time-consuming trial and error process gone through at the New Jersey State House Annex.

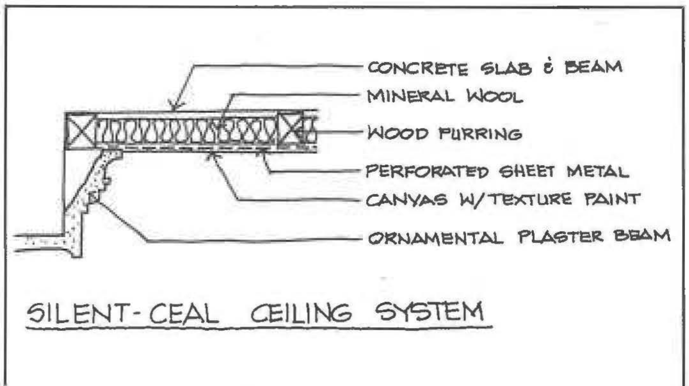

Figure 3. Silent Ceal ceiling system.

Notes

[1] Ion 417 is a product of Chemique, Inc., Moorestown, New Jersey.

[2] Asbestos-containing Zenitherm was restored by the AMR Group of Camp Springs, Maryland. Non-asbestos-containing Zenitherm was restored by the Cleveland Marble Mosaic Company of Cleveland, Ohio.

[3] Reproduction Zenitherm was made by Felber Ornamental Plaster, Inc., of Norristown, Pennsylvania.

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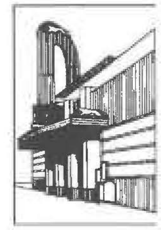

The Century Apartments: Lobby Restoration Will Restore Coherence of Original Building, But What Color Should the Harewood Be? And Other Veneer Tales

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The topic of this paper is not restoration involving exotic manufactured products, but rather a natural product, wood, used in broad expanses. Until the early twentieth century wood was usually employed in buildings - as opposed to furniture - as solid lumber or in relatively small veneered panels. By the 1920s, techniques had been developed to produce much larger veneered panels quickly and relatively inexpensively. Wood veneers which had been used primarily on furniture were quickly adopted in architectural applications. At the same time, many exotic wood species were being introduced into the world market from the tropics. Some of these species were relatively rare, and their stocks were soon depleted. Certain woods found favor in the Art Deco period because of their color and figure. Two of these woods are discussed here, as used in an important building of the period.

The Century Apartments of 1931 is one of the four twin-towered apartment buildings on New York's Central Park West and contributes significantly to the character of that famous urban wall. It expresses decorative forms of the new Machine Aesthetic, which was distilled from earlier Art Deco forms. A handful of motifs were developed on the building's exterior, primarily from brick banding and strips of windows. These elements produce lively interactions of mostly straight lines. The interior decorative motifs were direct quotes and variations of the exterior motifs, giving an exceptional coherence to the building.

The three original lobbies were crafted in this developed language from typical materials of the period, which are noteworthy in their opulence. All of the decorative metal work in the interior was nickel silver, an alloy of copper, nickel, and zinc that resembles silver in its color and luster. The wood paneling gave the spaces their overall tonality, while enlivening them with their grain patterns. An original offering brochure for the building showed photographs of the lobbies with descriptive captions that included the colors of the elements.

The two smaller lobbies are largely intact. Their walls are covered with marnut, a dark brown South American hardwood believed to be of the rosewood family. There are a few accent panels of mahogany. Some of the marnut veneer at the window jambs is damaged or missing.

The main lobby has been renovated several times since 1950. Photo captions in the offering brochure said the original walls were paneled in "grey" harewood (dyed English sycamore, *Acer pseudoplatanus*), trimmed with nickel silver, creating a silver-gray tonality in the space. Probes revealed all of the original paneling in place behind layers of plaster, gypsum board, canvas, and hardboard. The wood appeared to be English sycamore, with the typical "fiddle back" or "crossfire" figure, but was brown. Two existing pieces of furniture, also called "grey" harewood in the offering brochure, are also brown. Research revealed that the grey harewood was manufactured by boiling sliced veneer in ferrous sulfate, which reacts with tannins in the wood, and that the resulting color fades with time. Building residents reported that the paneling was brown by 1950, less than twenty years after the building opened.

The existing concealed paneling is irreparable, so new paneling must be fabricated and installed. Therein arises the problem. Although grey harewood is still commercially available, it is not an acceptable choice to the building owners because of its impermanence. The original tonality of the lobby was lost very quickly, but attempts were made to retain the color. Canvas was applied to the wood paneling and painted silver-gray. This canvas was covered in later renovations.

The color of grey harewood could be achieved by dying or staining English sycamore. Either choice is problematic. Pigmented stains would obscure the grain of the wood, and aniline dyes are not light-fast. The proposed solution is to dye English sycamore with aniline dyes, and coat the wood with lacquer to which an ultraviolet light inhibitor has been added. Almost no direct sunlight reaches the walls of the lobby, so the color degradation will be much slower than if they were reached by the sun's rays. It is not known how long the color will last, but this system can be renewed (albeit with great effort) in situ.

An alternative is to use an entirely different wood that resembles the grey harewood in both color and figure. There is such a wood, called San Domingo harewood (*Zanthoxylum spp.*), which has the cross-fire figure but is yellow grey when freshly cut. Upon exposure to light and air it turns silver grey. This harewood, also known as Concha satinwood, is imported from the West Indies and is of limited availability. The fact that it ages to the desired color, however, makes it an interesting alternative. The fresh panels could be dyed, and the ultraviolet light inhibitors left out of the lacquer. The desired results would be that as the aniline dye fades, the eventual color of the harewood would develop, but this is conjecture.

Despite all of the uncertainties, the effort of reintroducing a material that has questionable longevity is warranted because it will restore the design coherence of an important building, at the same time resurrecting a visually stunning space.

Repairing the marnut veneer in the smaller lobbies is also a problem. A few pieces of the veneer are needed to replace the missing sections. Marnut was imported until the 1950s, but was not definitely classified. A reference pamphlet of architectural and cabinet woods from the 1950s describes marnut as 'either a *Dalbergia* or *Machaerium*[1]. It resembles Sissoo and looks very much like some shipments of Kingwood' [*Dalbergia cearensis*, a rosewood]. Because the wood is no longer imported, and its exact species is not known, finding replacement pieces is a problem. I obtained samples of the lumber and the veneer from my father, who worked with the wood in the 1950s, and took those samples to various veneer suppliers to find a close match. Only the kingwood was close, and not very.

The two largest veneer wholesalers active in the 1930s have gone out of business and their stocks of remaining veneer were recently auctioned in small lots. Some marnut veneer is said to be in those lots, and we will try to find out who bought that veneer to procure the few pieces required for this restoration.

This search for the veneers for this project is illustrative of the extensive detective work sometimes required in restoration projects for buildings even as young as sixty years. In the case of the harewood, we had to find what remained in place, and when we did, we had to determine why it wasn't in accord with the archival source. Having done that, and discovering that the original material was unstable, we had to determine methods to achieve the same, but longer lasting, effect. With the marnut, the problem is finding a source. The veneer is sitting in some shop or warehouse somewhere, and it must be located.

The third wood veneer used extensively in the lobby of the Century Apartments was Macassar ebony (*Diaspyros melanoxylon*), found in the one remaining original elevator cab. All of the elevator cabs were modernized, but one original cab was left in place at the bottom of an elevator shaft. As part of the restoration, the cabs are to be rebuilt to replicate the originals. Fortunately, Macassar ebony is readily available.

Notes

[1] *Characteristics of Modern Woods*, fifth edition (Marshfield, Wisconsin: Roddis Plywood Corporation, 1956).

Wondrous Fiber-based Wallboards of the Twentieth Century

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Beginning in the mid-nineteenth century, the United States experimented with the production of fiber-based boards designed initially for general thermal insulation purposes and increasingly for the building trades as sheathing, and interior and exterior finishing materials. These rigid sheet building boards were composed primarily of wood, vegetable or other natural fibers including grasses, reeds, rag, straw, bagasse, jute, flax or hemp. Some manufacturers used waste materials such as sawdust, bark, oat hulls, spent hops, newspaper and peanut shells. However, most of the boards were mechanically or chemically processed from wood pulp or paper.

Practical in concept, these board products responded to a need for thermal and sound insulation while they utilized huge quantities of mill waste that the paper and lumber industries could scarcely dispose of or justify in the face of a growing forest conservation movement in the 1910s. The resulting boards, generally categorized as insulation boards, wallboards or hardboards, became indispensable in the early to mid-twentieth century when World Wars I and II brought on booms in housing construction, the development of numerous new industries and "makeovers" of many existing industrial and commercial establishments.

It is often difficult to recognize these materials at a glance because their surfaces are intentionally treated to mimic traditional materials such as painted plaster and wainscoting, or "modern" materials like textured or enameled panelling. Certainly the presence of batten framing panels that have a fibrous textured surface (resembling burlap or a screen-type weave in some cases) would appear to be insulation board--often found finishing attics and basements of homes from the 1910s and onward. But as medium density fiberboards (wallboards) and hardboards became readily available in the late 1920s, these densely-pressed, smooth-surfaced boards with masked installation systems become more difficult to visually distinguish from other materials. In many cases, removal of panels is required to allow examination of the cross-section of the specific composition of the board and, with any luck, a manufacturer's trademark on the reverse side.

A 1928 study of patents relating to the industry revealed that more than two hundred variations on this building board theme had been devel-

oped by this time.[1] The continued explosion in the number of related patents, to more than 600 by 1957, indicated in part the widespread application of this material in the American building industry. Manufacturers and common trade names included: Masonite Presdwood, Quartrboard and Tempred Presdwood; Insulite Bildrite, Satincote, Smoothcote, Ins-Lite, Graylite and Bronzelite; Johns-Manville J-M Board; Homasote; Beaverboard; Celotex C-X Boards; Feltex; Fir-tex; Bird & Co. Neponset and American Wallboards; Maftex; Nu-Wood; and Upson Board.

Insulation and Medium Density Wallboards
One of the earliest corporations to successfully mass-produce a fiber building board was the Agasote Millboard Company of Trenton, New Jersey. Accounts suggest that the Trenton plant was established in 1909 and began production of a fiber board designed for use as the curved ceilings and sides of railroad passenger cars and as interior panels for ships. By 1916 the company had introduced Homasote, its popular board product made of re-pulped newsprint.[2] The Homasote board was a less expensive product that was mixed with waxes and oils to provide weatherproofing elements. These boards were pressed into gray panels as large as eight by fourteen feet. Unlike competitors, Homasote boards were large enough to provide a seamless wall surface. At the outset, Homasote boards were primarily used in army huts until, in the early 1930s, new management of the company instigated an aggressive campaign to promote its use of Homasote insulating board in a variety of building types across the country.

At the same time, the company hired F. Vaux Wilson, Jr., to develop a prefabricated housing program using Homasote panels. Known as Precision-Built homes, these prefabricated, four-room structures had interior and exterior walls of Homasote. Through a system of franchised lumber dealers, the company began to promote production of Precision-Built (which took one day shop labor and eight to twelve days in the field to assemble) and Junior Precision-Built (which took three days in the shop and three in the field to assemble) homes. The most innovative of Wilson's promotional ideas was department store merchandizing of Precision-Built homes. Stores such as Jordan Marsh in Boston, Fox's in Hartford, Macy's in New York City, Lit Brothers in Philadelphia, Frederick and Nelson in Seattle, and Barker Brothers in Los Angeles would display a quarter-scale model of the home, stock literature on the forty-some home designs available and have trained sales people available to answer questions. As innovative as this marketing scheme appears, there are few statistics to document its effectiveness. The department store merchandizing program was discontinued shortly after World War II, perhaps because Homasote was busy responding to the demands of the Federal Public Housing Authority which commissioned the construction of 977 Precision-Built houses in Vallejo, California, and 5,000 others in Portsmouth, Virginia. Though popularity of the Precision-Built prefabricating housing concept did not continue in the post-war years, production of Homasote's insulating and wall boards did. They are still marketed today as the logical choice for siding, ceilings, soffits and walls, and are particularly useful in home improvement projects such as adding rooms, blocking windows, or converting carports, basements and attics to finished rooms.

Another early manufacturer of insulation board was the Minnesota and Ontario Paper Company which patented the first rigid, wood-fiber insulation board, "Insulite," in 1914. Carl Muench established the International Falls, Minnesota plant and in his 1947 *Outline of the Insulation Board Industry* explained that until 1914, the first commercially available insulation materials were quilt insulations, including Cabot's Quilt and the Union Fiber Company's Linofelt. Semi-rigid insulation felts like the Bohn Refrigerator Company's Flaxlinum and Union Fiber Company's Fiberfelt were superseded by board form insulation because the former could not be used as an interior finish or base for plaster.[3] The company went on to develop other, what they called, "structural insulation" products such as Ins-Lite building board and Luster-lite interior and tile board that were made from hard Northern wood, felted into strong, rigid boards. They also made Fiberlite Acoustical Tileboard which was made of coarser fiber and was more loosely formed during manufacture to increase its sound-absorptive qualities. Another category of Insulite boards was the Graylite line, which included boards made from the same hard wood fibers of Ins-lite products and treated with asphalt to provide greater strength and moisture-resistance. The resulting boards included Bildrite, Graylite sheathing, building board and roof insulation, and Lok-Joint Lath. Lath such as Lok-Joint was secured to with studding with nails and to adjacent panels with "locks" that

Advertisement for Insulite, 1940.

ensured a tight fit and no seepage of moisture behind panels during the application of a plaster wall finish.

Though there was great variation in the composition of these building boards, the manufacturing processes used were similar from one company to another. The majority of fiber wallboards were formed by mechanical processing. First, the log or sawmill waste was processed into pulp chips by means of a rotating disk chipper. The pulp chips were then sized and moved on to the grinder where the wood cells were separated by frictional forces and steam pressure. This energy-intensive pulping process involved high temperatures and water to soften the fiber bonds of the wood, which would permit better natural bonding in the consolidation stage.[4]

Then the pulp was allowed to flow in a current of water onto a screen, and with the application of heavy pressure excess water was removed and pulp sheets were formed. The press platens containing steam or hot water provided smooth, planar surfaces against which the fiberboards were molded. Pressure reduced the mass of the fibers to a stiff, strong dense board of interlocked wood fibers.[5] The last steps included drying, trimming, and finishing with special colors, beveling, or kerfing.

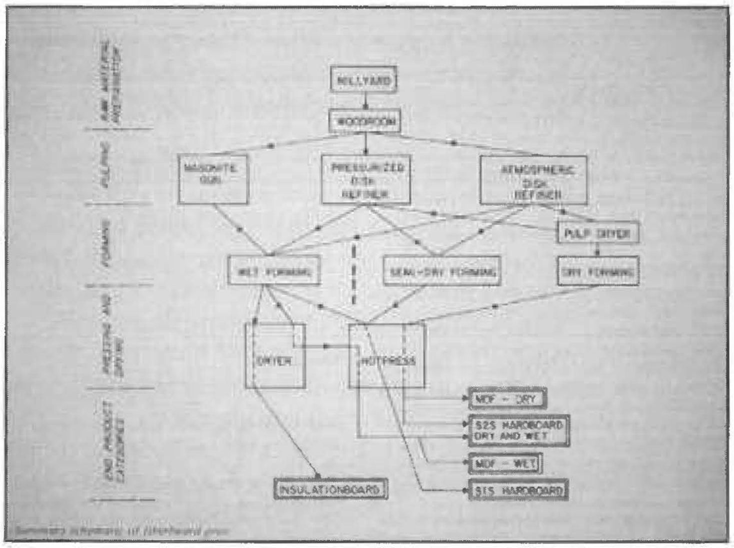
In the 1920s very little finishing was done; principally brown insulation and medium-density boards were sold "as is" with the intent of their being painted on-site. Advertising in the 1930s demonstrated the multitude of uses for these boards, particularly those with specialty finishes to mimic plank, tile, and a score of different smooth and textured surfaces. By the 1940s the largest amount of labor in insulation board plants was expended in finishing large boards as they came out of the drier.[6]

A relatively small percentage of fiber boards were manufactured by chemical or sulphite processing, a process in which wood cells are separated from one another primarily by dissolving and removing the natural bonding agent in a solution of sodium sulphate and caustic soda. In 1937 it was estimated that "80 percent of [the pulp for] wood fiber boards [was] produced by the mechanical process, about 20 percent by the sulphate or a combination process [Kraft process] and a very small percent by the sulphite process (less than 2 percent).[7] By 1979 the USDA noted that all pulping processes in the manufacture of fiberboard were mechanical and that chemicals were no longer used for the purpose of dissolving the natural bonding agent of wood. By the time of the later study, chemical treatments were generally related to the fireproofing of hardboard.[8] After the breakdown of wood pulp into fiber by chemical processing means, the methods of pressing and drying were similar to those used in mechanical processing.

Both mechanically and chemically processed boards were treated in the pulping process with waterproofing material to prevent dry rot, fungi growths and termites. A variety of adhesives were used in the consolidation of the fibers, such as silicate of soda, flour paste, various glues, dextrin, asphalt, or a mixture of water-glass and clay.[9] Other materials, including rosin, turpentine, paraffin wax, asphalt, asbestos, plaster-of-paris, and clay were often incorporated to improve qualities such as tensile strength or resistance to moisture, fire and vermin.

The greatest changes in the manufacturing process of insulation board related to the speed with which boards could be produced. For example, 1/2-inch insulation boards that had taken thirty-six hours to dry in 1910 took fifty minutes in 1947.[10] The post-World War II construction industry required mass-production of insulation boards to meet U.S. and international demand for this material. In turn, this encouraged continued research and development of rapid production and finishing techniques, including application of paints, lacquer, plastics and metals that rendered boards better suited for interior and exterior finishing of houses.

Throughout the 1910s and early 1920s there were so many small and large manufacturers



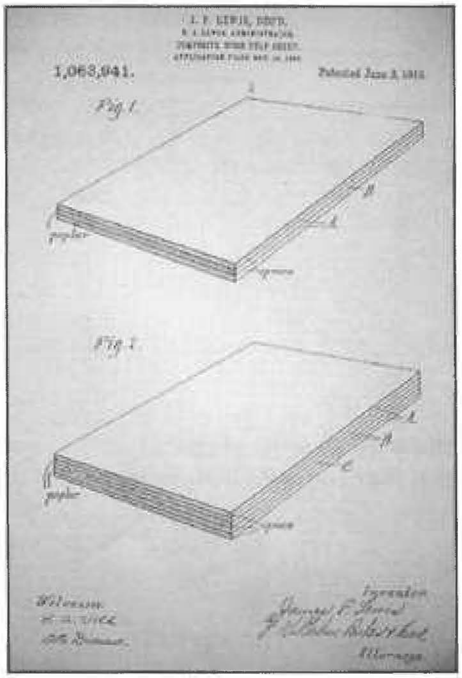
Schematic diagram of fiberboard processing.

producing these materials, and no single periodical or architectural supply catalog seems to account for them all. Presumably many smaller operations stayed regionally focused in their manufacture and distribution and would need to be investigated at the local level. Some companies got into fiber building board production by accident and became a national distributors. One such company was the Beaver Company of upstate New York. Inventor J.P. Lewis had been in the business of making large quantities of mat board for a picture framing operation when he decided in 1903 to use this board to replace lath and plaster in finishing his attic billiard room. He soon found there was demand by others to purchase the board to create similar effects in their own homes.

Before long Lewis' son, Harry S. Lewis, and a partner William McGlashan, initiated the Beaver Manufacturing Company of Buffalo, which was reincorporated as the Beaver Company in 1910 when they received a registered trademark for their product "BeaverBoard." Harry Lewis secured a patent on behalf of his recently deceased father in 1913, a patent that the senior Lewis had applied for in 1906. This composite wood pulp sheet consisted of separate outer and inner sheets of spruce and poplar pulp that was bound together with a cement containing silicate of soda. Spruce was selected for the outer layer because its long fiber produced a strong sheet with a smooth, tough surface, and poplar was selected for the core because it had a short, fine fiber that would not warp but was rather brittle and too soft a surface for the face layers of the board.[11]

In 1914 John H. Thickens, assignor to the Beaver Company, applied for and received a patent for an improved wallboard "having high rigidity, high tensile strength, low moisture absorption, high resistance to puncture and having good heat-insulating and sound-deadening properties..to some extent fire resistant which [could] be used behind radiators...[with] a smooth and attractive surface well suited for ornamentation."[12] By this time the company renamed itself the Beaver Board Companies and claimed to have opened plants "in principal cities" along the East Coast, from Ottawa, Canada to Roanoke Rapids, North Carolina. Beaver Board was suggested for use as either a wall or ceiling covering with decorative battens to cover the seams.

As the Beaver Board name spread across the northeast, the company began to increase its product line by offering Beaver Tile (1915), and Beaver Blackboards (1916). The Beaver wallboard product was modified in 1917, now having facing sheets impregnated with cedar oil to act as a moth repellent. The years between 1918 and 1922 seemed to be the company's "heyday." Prosperity and fame were evident in everything from the company's advertising campaigns to its registry of world-wide distribution. An advertisement in the Buffalo City Directory of 1919 displayed the well-known



Patent diagram for composite wood pulp sheet, patented in 1913.

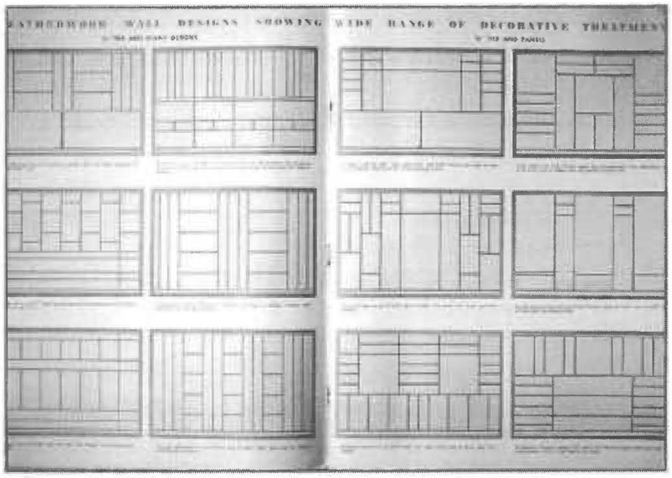
Beaver Board trademark beneath which the company guaranteed quality results with every piece of Beaver Board containing the stamped trademark on the back. The advertisement also gives the consumer an idea of the company's distribution by its list of international and domestic branches reaching from Canada to London and from Atlanta to San Francisco.[13]

Like all responsible manufacturers the Beaver Board Companies provided consumers with installation and maintenance advice. Their pebbled textured or smooth surfaced boards (faced with a thin layer of ground, as opposed to cooked, wood) could be hung on studs with seams covered with decorative battens. They were to be laid out in a carefully planned arrangement and nailed no closer than 3/8 inch from the edge of the board with nails no more than three inches apart. Boards were installed where there was no risk of their absorbing moisture, and they were not painted until they were sized.

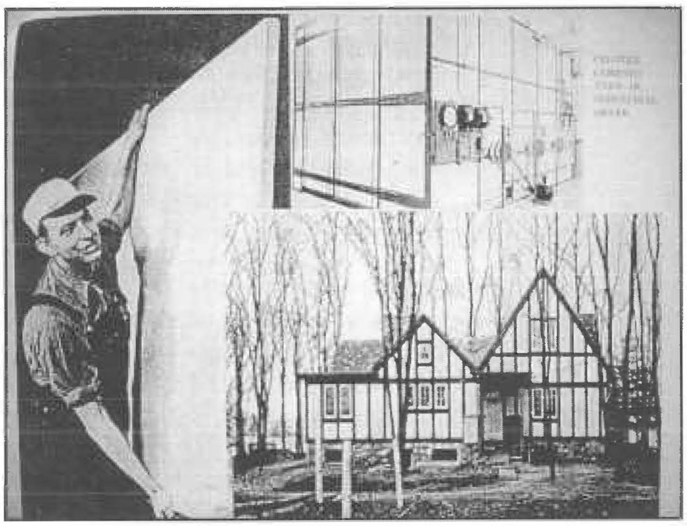
Trade journal treatises on the installation of interior finish wallboards revealed numerous designs for interior panel arrangements with complementary ceiling treatment patterns. *Building Age*, for example, suggested that all vertical panels be used to increase height in a room. Other arrangements included vertical panels with a continuous frieze, and vertical panels above a continuous dado or a design that included a combination of a dado, vertical panels and a frieze. The latter design was recommended specifically for dining rooms, libraries, dens, offices, stores, school rooms and theaters.[14] Perhaps one of the most illustrative diagrams of the numerous panel design options was provided by the Upson Company in their 1922 "Interiors Beautiful" catalog. They provided ten different wall and ceiling treatments that clearly demonstrate the ability of these panels to heighten, shorten, or provide vertical and horizontal emphasis to a room. Any one of these boards could be finished with paint, stencils, baked-on enamels or glazes or with paper or fabric wall covering. Wood decorative or panel strips were usually 1/4" to 1/2" thick and of widths to meet architectural requirements. In more modern (circa 1940) decorative treatments, metal moldings of plain or polished chromium, copper, brass, or bronze were used to conceal joints, corners, angles, etc. This type of decoration was recommended for restaurants, bars, cafes, stores, soda fountains, beauty parlors, store displays, bathrooms and kitchens.[15]

Contractors generally applied insulation sheathing board to the studs in any frame construction on 12 or 16-inch centers with two-by-four headers inserted flush between the wood studs to provide a nailing surface for the wallboard and battens.[16] Some companies developed special mechanisms for fastening boards in place, such as Upson Company's self-clinching fasteners with "in-to-stay nails," which were designed to cut installation time in half, eliminate nail holes at the center of panels and avoid the need for countersinking nails and filling holes.[17]

The Celotex Company of Chicago was the only manufacturer to use cane fiber in the production of their fiber board. Introduced into the market in 1920, these boards (like competitors') were used as exterior finishes or as sheathing under roofing materials or wall veneers of brick, siding, wood shingles or stucco.[18] New products in 1937 included Celotex's "Cemesto," a fire-resistant insulation board surfaced on one or both sides with asbestos-cement that was used in service stations, industrial drying plants, housing, and for partitions in office and commercial buildings.



Advertisement showing suggested applications of Upson Board on walls and ceilings.

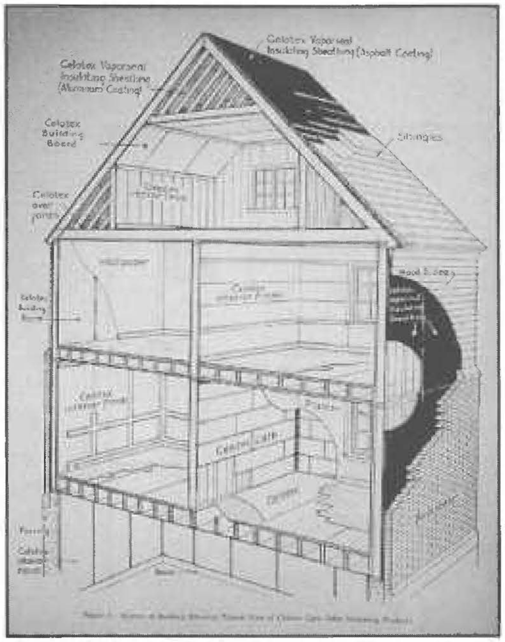


Advertisement showing the use of Celotex in construction of an English half-timber style residence in Paw Paw, Michigan.

From the combined sources of company annual reports, trade catalogs and the corporate newsletter, it would appear that Celotex was used in some of the most prominent buildings and displays of the 1920s, 1930s, and 1940s. It was used to insulate new roofs at the White House (1927) and Rockefeller Center (1939), for promenades at the New York World's Fair Exposition (1939), to provide triumphal arches at the weddings of Swedish (1929) and Bulgarian (1931) royalty, to provide an interior finish to the Olympic Winter Games Clubhouse in Lake Placid, New York (1932), and to insulate the Pope's private apartments in Vatican City (1933). In 1938 Celotex claimed to have insulated more than 600,000 homes in the United States alone. Today, one can traverse the State highways of colder climates in September and find a handful of homes clad with Celotex insulation board awaiting the exterior sheathing.

Hardboards

The hardboard industry was instigated with William H. Mason's 1926 accidental discovery of the process by which wood fibers could be exploded in a gun, and formed into boards through application of greater pressure and higher temperatures than those used to manufacture insulation and medium-density wallboards. Hardboard was manufactured almost



As noted in a Celotex Company illustration, there were applications for insulation, sheathing, and interior finishes throughout a house.

exclusively by the Masonite Corporation which held the patents for the apparatus and the process from 1928 until the 1940s. Holding these patents, the Masonite Corporation was the sole distributer to other hardboard suppliers including companies such as Celotex, Johns-Manville, Armstrong Cork, National Gypsum, Flintkote, Insulite, Certain-teed, Hawaiian Cane and others.[19]

Hardboard opened up a world of expanded uses for "wallboards" given its density and increased strength. Masonite's most popular product, Tempred Presdwood was easily adapted to a multitude of interior and exterior uses. Either finished or plain Presdwood and Presdwood Temprtile became commonplace in kitchens, baths, commercial dining rooms, lobbies and other high traffic areas that required heavy duty cleaning. Masonite's hardboards were also used extensively in concrete form work for buildings and in cabinetry for closets, radiators covers, and a variety of other partition work.

Hardboards were manufactured to greater densities than insulation and wall boards. This density was achieved through the application of greater pressure and higher temperatures. Masonite's process was often referred to as a "wet process" because of the amount of water used in the breakdown of pulp and in distributing the fibrous materials, but it varied most significantly from other mechanical processes by involving steam pressure to explode the wood chips in the initial phase. The advantage of this method was that it more effectively preserved the lignins (the natural cementing structure in the wood) in the final product, giving the board greater strength.

A "dry process" for the forming of hardboards was developed in the early 1950s. The core fibrous mat was still produced by steam explosion and soaking in water, however, this mat was then dried completely before being consolidated into hardboards. Pressures used in the dry process ranged from 1000 to 1500 psi. The resulting product was smooth on both sides with the fibers refined to a higher degree and waste reduced to less than three percent.[20] Because this process did not entangle and form the ligneous bonds that the wet process did, synthetic resin adhesives were added to improve board strength.

Masonite called a good deal of attention to its hardboard products at the 1934 Century of Progress World's Fair in Chicago. The Masonite house was the epitome of insulation and wallboards use throughout a modern house. Beyond this, millions of feet of Masonite boards were built into the exposition - floors in the Hall of Science, the sea wall around a lagoon, the finishes in a garden restaurant, the Swift Orchestra shell, and drinking fountains, loud speakers and lighting pylons throughout the grounds. Demonstrations such as these helped Masonite convince potential clients, including the federal government, of the contributions it could make to developing industries. Throughout World War II, Masonite became an indispensable supplier for military construction in the United States and abroad.

By this time, Masonite and its colleagues, the manufacturers of insulation board and wallboard, were recognized for the tremendous versatility they afforded the building industry. Fiber building boards in general were overshadowed by particleboard and plywood in the 1960s.[21] However, several manufacturers, including Masonite, actively maintained production of these boards for the furniture and toy industries. Today, Masonite's building products include exterior siding and paneled door

Masonite advertisement for Presdwoods, 1946.

facings, while others like Homasote and Celotex continue to serve the insulation industry with boards very similar to those they produced in the early twentieth century.

Notes

[1] Joseph Rossman, a patent engineer and author of the study, noted that "only since 1906 [had] the first pulp board on the market [been] called

'wallboard' with a view to take the place of lath, plaster and wood paneling." "History of Laminated Wall Board Patents," *Paper Trade Journal* 86 (19 January 1928): 45.

[2] "Old Newspapers to New Houses," *The Architectural Forum* 73 (December 1940): 531-32.

[3] Carl G. Muench, "An Outline of the Insulation Board Industry," *Paper Trade Journal* 125 (31 July 1947): 48-51.

[4] Otto Suchsland and George E. Woodson, *Fiberboard Manufacturing Practices in the United States* (Washington, DC: United States Department of Agriculture, Forest Service, Handbook No. 640, Government Printing Office, 1986), 59.

[5] Howard F. Weiss, "Man-Made Lumber: Revising the Structural Arrangements of Saw-Mill Waste to Make Possible its Utilization," *Scientific American* 130 (April 1924): 251.

[6] Muench, 50.

[7] *Wall Boards and Insulating Materials* (Washington, DC: U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Forest Products Division, 1937), 12.

[8] Suchsland and Woodson, 13.

[9] "History of Laminated Wall Board Patents," 45.

[10] Muench, pg. 50.

[11] U.S. Patent No. 1,063,941, 3 June 1913. (Application filed 19 November 1906.)

[12] U.S. Patent No. 1,121,951, 22 December 1914. (Application filed 17 September 1914.)

[13] By 1928 it was rumored that Beaver Board Companies might merge with another company, the Certain-teed Products Corporation. Further investigation should be made into this possible merger and the assimilation of Beaver Board products under the Certain-teed name.

[14] "Details of Wall Board Paneling," *The Building Age* 38 (February 1916): 63.

[15] Frank R. Walker, *The Building Estimator's Reference Book* (Chicago, Illinois, Frank R. Walker Company, 1940), 990.

[16] Two-inch galvanized nails with 3/8 or 1/2 inch heads were prescribed: 8d common nails for 25/32 inch insulation board, or 1-1/2 inch galvanized roofing nails with 3/8 inch heads for 1/2 inch board. Long boards would be applied vertically to the framing, with initial nailing to the intermediate members followed by nailing around the edges. On the intermediate members nails were spaced six inches apart and otherwise three inches apart and 3/8 inches in from the edge at the periphery of the board. A 1/8 inch space should be left between each board. "Insulation Board for Home Building," *American Builder* 61 (December 1939): 57.

[17] *Interiors Beautiful*, The Upson Company, Fiber Board Authorities Private Collection, Lockport, New York.

[18] *Celotex Manual for Architects* (Chicago, Illinois: The Celotex Corporation, 1937), 10.

[19] John M. Coates, *The First Fifty Years* (Chicago, Illinois: The Masonite Corporation, 1975), 11.

[20] "Small Plant Set-up for Insulation and Hardboard Manufacture," *Paper Trade Journal* 131 (19 October 1950): 42.

[21] F.P. Kollman, Edward W. Kuenzi, and Alfred J. Stamm. *Principles of Wood Science and Technology, Volume II - Wood Based Materials.* (New York, New York: Springer-Verlag, 1975), 317.

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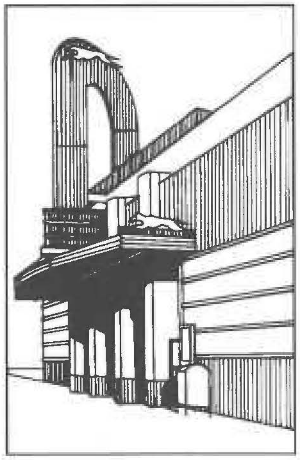
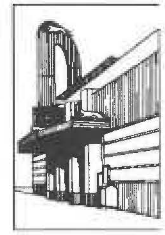


Finishing the Future

When the Artificial Becomes Real,
Anthony Walker

Structural Glass: Its History, Manufacture, Repair, and Replacement,
Carol J. Dyson and Floyd Mansberger



When The Artificial Becomes Real[1]

A study of the significance of the development of plastics, the ultimate synthetic material, for buildings.

Anthony Walker
Damond Lock Grabowsky & Partners
London, England

The nineteenth century saw demands for an architecture of its time in a form appropriate to the new social, economic and technical conditions.[2] In response to the aggressive urban environments of the time architects sought easily maintainable materials, ones which would demonstrate cleanliness and durability, and they were willing to sacrifice the aid that time gives a building by blunting its edges, softening and blending its colours in order to maintain its appearance.[3] The demand was clearly for an architecture inspired by technology but which would last.

Tony Garnier wrote in 1918 that "Truth alone is beautiful. In architecture, truth is the result of calculations made to satisfy known necessities with known materials."[4] This sentiment was echoed by Le Corbusier's call for "the replacing of natural materials by artificial ones, of heterogeneous and doubtful materials by homogeneous and artificial ones (tried and proved in the laboratory) and by products of fixed composition."[5] Sophisticated materials with lustrous, shining colours and the limpidity of glass[6] were sought and were to be provided by the developments in steel, aluminium, linoleum, celluloid and cement.[7]

The modern plastics industry was in its infancy at the opening of the twentieth century. Natural plastics, horn and shellac, had been used for small objects for hundreds of years and they were valued for their appearance and mouldability.[8] During the nineteenth century gutta percha, bitumen, bois durci and papier maché products had developed rapidly to include many decorative as well as functional building applications.[9] The 1862 International Exhibition in London brought the first public display of a semi-synthetic plastic, Parkesine, a cellulose nitrate material that was to be successfully developed by Hyatt in America under the name of Celluloid.[10] The turn of the century saw the first of the synthetic materials with the development of phenol-formaldehyde resins by Dr. Baekeland who registered a patent in February 1907.

Although this resin was to be the cornerstone for the development of high pressure laminates such as Bakelite, Formica and Wareite, the molecular structure of plastics was not unravelled until 1922 when Hermann Staudinger, working on the production of synthetic rubber, discovered that the basic polymers were in fact chains of many thousands of smaller molecules or monomers which gave them their unique properties. This opened the door for the development of designed polymers and the 1930s saw a dramatic range of new plastics: polymethyl methacrylate (acrylics), 1933; polyethylene (polythene), 1933; polyvinyl chloride (PVC), 1935; polystyrene, 1937; polytetrafluoroethylene (PTFE), 1938; polymide (nylon), 1938.

With this flurry of new materials, the plastics producers saw the building industry as a major market to be exploited. The early phenol-formaldehyde resins had been remarkably successful: although the original impetus was to provide a substitute "for-mica" as an electrical insulator, their dark browns and blacks both complimented and contrasted with the chrome and glass streamlined designs of the 1920s and 1930s.[11] The new plastics, including the urea and thiourea formaldehydes, offered a new

challenge: transparency and an unlimited range of colours. It was both appropriate and ironic that the BBC should have been instrumental in the development of the use of these materials in buildings: appropriate in that their new recording studios in Portland Place were symbolic of the new technology and ironic because it was only due to a ban on the use of foreign goods that the studio designers McGrath, Coates, and Chermayeff were forced to find a substitute for the coloured Trolit wall coverings that they had first seen in Gropius' 1930 German pavilion in Paris.[12] By the end of the 1930s the change was complete and in 1938 Matthew Luckiesh wrote rejecting what he saw as the bleak tones of the era and which would be replaced by a liberation of the colours from the modern artist's palette into everyday life.[13]

The Vinylite house at the 1933 Chicago Fair was one of the first of a series of "all-plastic" houses demonstrating the ubiquitous nature of the materials.[14] Everything but the plumbing was made with vinylite resins including a prefabricated system of wall panels. Not only could the polymers be tailor-made to suit particular requirements, but since most plastics rely on a combination of other additives there are almost no limits to the qualities of the final material.

In the inter-war period, plastics used in jewellery and small objects had taken on the role of a quality material described as richly attractive with varied colouring and seeming to surpass alabaster in brilliancy and depth.[15] In 1925, at the Empire Exhibition at Wembley, British Cyanides displayed a new plastic, urea thiourea formaldehyde; which, unlike Bakelite, could be made in light colours and in the following year caused queues of customers in Harrods.[16] It was accepted that plastics had their own attributes,[17] but by 1935 Herbert Read, while acknowledging that they had great possibilities, did not consider that they had found appropriate forms of expression.[18] A New York Museum of Modern Art exhibition in 1940 featured useful objects under ten dollars, encouraging the spread of plastic in popular use, and in many ways plastics were seen as a social equaliser helping overcome the high costs of materials brought about by scarcity.[19] The same year *Fortune* magazine ran an article about the plastics industry and illustrated it with an imaginary continent called Sythentica. The magazine described the new materials in extravagant prose as extending right out of the natural world and with boundaries as unstable as the map of Europe![20]

The Second World War brought new demands for radomes, miles of electrical cable, lightweight boats and moisture-resistant coatings for the Pacific, accelerating the development of plastic products and establishing their acceptability in their own right as materials to suit the new demands. Yarsley and Couzens wrote enthusiastically in 1941 of the Plastic Man coming into "...a world of colour and bright shining surfaces, where childish hands will find nothing to break, or sharp edges or corners to cut or graze, no crevices to harbour dirt or germs...."[21]

Despite some initial problems brought about by the use of inferior recycled materials in the immediate post-war period plastics were seen as providing the virtues of durability and cleanliness combined with colour and pattern and were widely used in hospitals, kitchens, ships, and trains.[22] In 1939, Wareite had manufactured a laminate incorporating a drawing by the cartoonist Nicholas Bentley for the cocktail bar of the Coronation Scott displayed at the New York World's Fair.[23] Production of decorative laminates by Formica and Wareite ceased during the war, but the post-war period saw a rapid development of patterns, one-off designs, and decorative effects. The Festival Pattern Group set up under Mark Hartland Thomas produced a unified series of patterns applicable to a wide range of materials for the 1951 Festival of Britain. The new photographs of the crystalline nature of matter were seen both as a design inspiration and a reflection of the unity of art and science in the progress to a better future. As laminates came into the wider market place they needed to be fashionable, but being a durable product needed a "durable" colour.[24] *Design* magazine, in reviewing a new Wareite range in 1957, pointed out that the patterns should not be confused with those used for textiles, where the folds and pleats impose a different discipline, nor are they the same as wallpapers, being more formal due to their durability and rigidity.[25]

Post-war Britain also faced major challenges in providing new schools and the Hertfordshire programme was one of the foremost in developing the "kit of parts" approach to meeting the needs of the 1950s and 1960s. The separation of frame and wall allowed the use of interchangeable Holoplast panels enabling flexibility in use and design.[26] In conjunction with a simple aluminium framing system, they were used internally and externally, hollow or with various fillings to achieve thermal and acoustic stan-

dards, and even fitted with internal heating elements, and their bright colours reflected theories of abstract design rather than the essence of the material involved.

Plastics had been reinforced with various materials since the nineteenth century and although the benefits of glass fibres were recognised soon after their production in 1935 their inability to withstand the pressure used in curing thermosetting plastics meant that it was not until cold curing polyester resins emerged at the beginning of the 1940s that glass reinforced plastics (GRP) were a practical possibility. Following the war they were used for structural and semi-structural applications ranging from wall cladding to complete room units or kits of parts for assembling dwellings including the Ionel Schein House; at the Paris Exhibition in 1956,[27] Cesare Pea's system of plastic buildings developed in Italy in 1957,[28] and the Monsanto House in Disneyland in 1959.[29]

The development of a range of GRP structures and cladding systems followed including a series of small units for signalling equipment on British Rail in 1961, sub-stations for Scotland Electricity, and a two-storey telephone exchange by Mickleover Transport, Ltd., using simple forms with curved corners.[30,31]

Plastics were accompanied by a simplicity of design: clean cut lines and components that could be simply cast and moulded. They benefitted in the 1960s from the interest in form rather than surface and their lightness encouraged large-scale panels with simple sculptural shapes and smooth surfaces emphasising their ability to produce building elements as a single moulding as opposed to an assembly of parts.[32] They reflected the interest in mega-planning projects such as Archigram's Plug-in City, based on expendable or interchangeable components responding to Banham's questioning of the machine aesthetic[33]. Their biggest drawback was lack of fire resistance and the tendency of fire-retardant additives to significantly reduce the weathering and durability of the material.[34]

If the optimism of those who called for a plastics aesthetic proved illusory, the vinyl group of polymers, for example polyvinyl chlorides, acrylics, and polystyrene, served buildings in many forms, including cladding planks, gutters, glazing, finishes and insulation, their very ordinariness leading to their acceptance as the "natural" material for the purpose.

The Imperial Chemical Industry (ICI) house, built in Hertfordshire, England, in 1963, was not a demonstratively plastics house and projected an image of conventionality where plastics could be used as substitutes for other materials such as timber boarding, could provide an easily cleaned wall surface ranging from laminates to vinyl papers, could form a prefabricated bathroom or provide a more revolutionary but unseen use as linking discs for mortarless blockwork.

These more ordinary uses of plastics were characteristic. A committee set up by the British Plastics Federation reported in 1944 that the future for plastics in buildings was in resin-bonded laminated wood as a structural material, the development of sheet materials, trials of plastic piping and the manufacture of large components such as windows. By 1964 plastics had developed quietly but swiftly to the point where they dominated the related fields of coatings, claddings and coverings.[35] In America in the late 1960s it was claimed that plastics in one form or another had invaded every building material market and every phase of the construction industry.[36]

The ability of plastics to mimic other materials together with the diversity of the finishes and properties available deny the material a specific image. Sir James Stirling in his statement to the second Iran International Congress of Architecture in 1974 dismissed the concept of "truth to materials" and instead stressed the need to use forms and shapes with which people can identify claiming that, "According to what is appropriate for a particular building problem the building could be made of any materials...that the whole spectrum of the past is available from earth works to plastics..." which fulfilled its needs.[37]

Stirling's use of the material's image of plasticity at the Olivetti training college in Haslemere might have been seen to be a form specific to the material, until we learn that he had earlier proposed carrying out the project in aluminium panels but could not do so for technical reasons. The plasticity was more an expression of the building programme, which had called for extendibility that Stirling translated into an extrusion temporarily interrupted.[38]

Writing in the 1970s, Professor Henryk Skolimowski argued for the concept of a variable rationale as the basis of modern design. He contended that there was a change from "form

follows function" to a new rationale based on quality of life and the dictum that "form follows culture."[39] Ettore Sottsass had declared in 1970 that for him the purpose of designing objects was to help people recognise and free themselves. His new Italian Radical furniture designs emphasised the primacy of image over function with laminate-faced deconstructive forms seeking to ally mass and high culture.

Plastics gave the designer an unprecedented and virtually unlimited control of the material.[40] The plurality of the designs produced in plastic reflect the freedom the material provided to respond to any design theme undermining the idea that materials possess their own genuine image.[41] The skin no longer represents the core, the surface is free to exist in its own right.[42] Ezio Manzini called for a new classification of plastics according to appearance and took the view that:

> ...the Modern Movement, with its declared aversion to decoration and surface ornament, was just stressing the element of novelty in the new technologies of the nineteenth century - a hitherto undreamed of capacity of controlling the surfaces of manufactured objects.[43]

Plastics, in common with several of the other new materials, are tailor-made to specific needs. We learn from traditional materials how they should be used and replaced, but with the new ones we are the instructors. For the conservationist they present a new range of issues and offer new solutions to old problems in the repair of traditional materials.

Although some thermoplastics can be repaired, the thermosetting plastics generally cannot. Even where it is possible, as with GRP panels, an initial close match is unlikely to weather at the same rate or even in the same way, leading in a relatively short space of time to it becoming very obvious unless a colour coating is applied to the whole surface. Unlike natural materials, where each is unique, the new synthetic materials can be reproduced and the significance of loss of original material is diminished. Replacement of elements or even whole facades may be more appropriate than repair, especially where the aesthetic of the original design relied on being maintained in pristine condition, as in Foster's Willis Carroon building where any variation in the glass would destroy the thin veil of the building enclosure.

Maintenance of building facades evolved during the century from the first cradle patent in 1896, and cleaning equipment has been raised to a design element in the facade with buildings such as Owen Williams Sainsbury factory of 1933, James Stirling's design drawings for the Cambridge History Library or Rogers' ultimate celebration of maintenance and evolution at the Lloyds building in London.[44] With such clear statements of intention to maintain a building should the materials be allowed to weather? Unlike Halsey Ricardo who saw durability as a compromise, architects of the twentieth century saw their buildings as "shimmering fabrics, woven of rich glass,"[45] "...a glistening all-steel structure,"[46] or "...their abstract beauty in sunlight before their first winters staining...."[47] A maintained image was of the essence.

The significance of plastic lies in its ability to free the designer from a material specific image: to allow the design to originate from the needs of the building programme rather than the nature of the material. The ability of plastic by virtue of its technical virtuosity is to be ordinary. For the conservationist, plastics building technology, which developed rapidly, is worthy of recording but the nature of the material does not require its retention, for its significance is in its freedom and not its constraints.

Notes

1 John Gloag, "The Influences of Plastics on Design," *Journal of the Royal Society of Arts* 91: 466-467.

2 William Curtis, editor, *Modern Architecture* (London, 1987), 16. Viollet-le-Duc.

3 *Builder* (July 1894): Halsey Ricardo regarding his houses in Melbury Road, Holland Park. "An endeavour has been made...to recognise and accept the present conditions of house-building in London - more especially as regards the dirt and impurities in the atmosphere. They are faced externally throughout with salt-glazed bricks...may be looked upon as proof against the disintegrating forces of the London air. These bricks being virtually unchangeable, I have had to renounce the aid that time gives a building by blunting its edges, softening and blending its colours: and whatever effect one can manage to secure, that effect is indestructible."

4 Tony Garnier, *Une Cité Industrielle* (Paris, 1918).

5 Le Corbusier, *Towards a Modern Architecture* (London: Architectural Press, 1946), 214.

6 Curtis, 101. Extract from J.P. Oud, *Holländische Architektur*.

7 Nikolaus Pevsner, editor, *Pioneers of Modern Design* (London, 1960), 30. Quotation from Henri van de Velde.

8 Colin Williamson, "150 Years of Plastics Degradation," *Polymers in Conservation*, N.S. Allen, M. Edge, and C.V. Horie, editors (Cambridge, 1992).

[9] Gutta Percha was used for speaking tubes, floor coverings (British Patent No 1302, 8 May 1857), mouldings (British Patent No 24, 1 October 1852 and British Patent No. 623, 3 November 1852) and even patented for roof tiles (British Patent No 383, 14 February 1853). Shellac was used for paints and varnishes and in conjunction with fillers for moulded objects. Vulcanised rubber produced mouldings and rubber seals and waterproofing patents abounded. Papier mache was used for mouldings.

[10] S.T.I. Mossman, "Parkesine and Celluloid," *The Development of Plastics*, S.T.I. Mossman and P.T.J. Morris, editors (London, 1994): 19. An extract from a statement by Hyatt in 1885: "We are aware that pyroxyline has been heretofore subjected to the action of spirits of camphor...and do not therefore broadly claim such a process but to the best of our belief and knowledge no successful means or apparatus have until now been devised to accomplish satisfactory results in economically, uniformly and thoroughly mixing the results."

[11] Anthony Bertram, *Design* (London, 1938), 43. Sir John Burnett, Tait and Lorne's reception desk at the Paisley hospital was described as "...exquisite glittering shapes...in stainless steel and black plastic...."

[12] The designs produced for the studios, in particular those by Raymond McGrath, Wells Coates, and Serge Chermeyeff, relied extensively on a new German cellulose material, Trolit, which had been introduced by Walter Gropius. *Architects Journal* (4 November 1931): 598. Raymond McGrath "...At the Paris Exposition de la Société des Artistes Décoratives in 1930 I saw one of the first successful uses of cellulose acetate wall sheets. This was in the German pavilion designed by the architect Walter Gropius. The possibilities were obvious at once.... " F.R.S.Yorke, "Details," *Architectural Review* 72, no. 429 (August 1932,): 65; *British Plastics and Moulded Products Trader* (October 1932): 205. Due to the restriction imposed by the Controller, the interior designers sought alternatives and proposed a new material Beatl made by Beetle Products Co., Ltd., of Oldbury, England, which was mounted on a 9mm plywood backing. Yorke reported this as "...a laminated sheet made from white paper impregnated with a liquid synthetic resin obtainable in almost any colour but never before manufactured as a wall covering. I understand, however, that since its inception at Broadcasting House it has become a standard product."

[13] Matthew Luckiesh, *Color and Colors* (New York, New York: Van Nostrand Co., 193), 153-155.

[14] J.G. Davidson and H.B. McClure, "Applications of Vinyl Resins," *Industrial and Engineering Chemistry* 25, no. 6 (1933): 645-652.

[15] *The Fancy Goods Trader* (December 1939), commenting on a range of plastic products from Runcolite using Runcolite, Beetle, and Bakelite.

[16] Sylvia Katz, editor, *Classic Plastics* (London 1985), 11. British Cyanides were saved from bankruptcy by this success and the moulding company Streetly Manufacturing went on to become the largest moulding company in Britain.

[17] *Modern Plastics* (September 1934), 14. Morris Saunders: "We must remember that plastics themselves are decorative materials with their own birthright of beauty and adaptability."

Jeffery L. Meikle, "Materia Nova: Plastics and Design in the US., 1925-1935," *The Development of Plastics*: 40-41. Paul T. Frankl challenged designers "to create the grammer of these new materials."

[18] *Listener* (9 January 1935).

[19] Jeffery L. Meikle, "Into the Fourth Kingdom: Representations of Plastic Materials, 1920-1950," *Journal of Design History* 5, no. 3 (1992): 178.

[20] "Plastics in 1940," *Fortune* 22, no. 4 (October 1940): 88-96, 106, 108.

[21] V.E. Yarsley and E.G. Couzens, *Plastics* (London: Pelican, 1941).

[22] "Plastics in Architecture," *Architectural Forum* (February 1937):147.

Lewin, Susan Grant, editor, *Formica and Design* (New York, New York: Rizzoli, 1991), 50. First supplies of Formica for dinettes table tops came in 1939 to replace the enamelled surfaces which chipped and left ugly black marks.

[23] Percy Reboul, taped interview with St John Brecknell, first sales manager for Wareite. Warite had been established at Ware in England in 1936 by M. Thoroughgood as an independent company to manufacture decorative laminates. Its main competitor, Bakelite, was providing other plain laminates for the train but had turned down the job because it was experimental. Warite, keen to make an impression on the market, was willing to give it a go, which included finding inks that would withstand the heat needed to process the laminate. Wareite was taken over by Bakelite during the war to provide manufacturing laminates and afterwards was the decorative laminate arm of Bakelite UK.

[24] Jack Alexander, "Patterns and How they Got That Way," *This Formica World* (October 1959): 2-3.

[25] *Design*, no. 100 (April 1957): 36.

[26] Anthony Walker, taped interview with Dan Martin, member of the Hertfordshire architects department and job architect for Somerfield school.

Joseph Singer, *Plastics in Building* (London 1952), 81. These panels, originally developed by a paper manufacturer as an outlet for his products, had been used before the war for partitioning on ships where their light weight combined with durability provided the ideal material.

[27] Z.S. Makowski, "International Developments in Plastics Structures," *Plastics in Building*, Irving Skeist, editor (New York, New York: 1966), 397. Sponsored by Charbonnage de France in 1955, the house was designed by Ionel Schein, Yves Magnant, and R.A. Coulon using eight prefabricated GRP segments linked to a central hollow column, which acted as a rainwater pipe. The floor was GRP sandwich units and the windows were of acrylic built into the structure. It was assembled and taken down fifteen times in its life. Its total weight was only 1,800 pounds and gave a usable space of 6,000 cubic feet.

Schein then went on to design other forms that made greater use of the structural potential of three dimensional forms in GRP of which his motel cabin of 1956 is a prime example.

[28] Peter Flynn, *Glass Reinforced Plastics and Building* (Thesis, University of Nottingham, 1979).

[29] A.G.H. Deitz, with M.E. Goody; F.J. Heger; F.J. McGarry; and R.P Whittier, "Engineering the Plastics House of the Future," *Modern Plastics* (June 1957): 143. The Monsanto House was sponsored by Monsanto chemicals and designed by Hamilton and Goody in 1957. It has four curved honeycomb filled shells cantilevered off a central core and acrylic windows on each side of the arms.

[30] Arthur Quarmby, *The Plastics Architect* (London 1974), 55-59 and 134.

[31] *Modern Plastics* (March 1962). Contemporary shell structures by Deitz reviews the considerable interest in single and double curved shells and folded plate structures using plastics in various forms.

[32] Peter Dormer, *Design Since 1945* (London 1993), 168.

[33] Reyner Banham, "A throwaway aesthetic," *Reyner Banham: Design by Choice*, Penny Sparke, editor (London 1981).

[34] Dr. Albert G.H. Dietz, *Paper and Plastics in Building*. Paper presented to the Seventh Conference of the Technical Association of the Pulp and Paper Industry (October 1956). "Building code officials are reluctant to approve the use of a material which may become a fire hazard and in the fire zones of large cities plastics are in many cases ruled out."

[35] R.E. Platts, "The Role of Plastics in House Structure," *Technical Paper No. 176* (Ottawa, Ontario: National Research Council Canada, April 1964), 1.

[36] Joseph Platzker, "Why Plastics Are Not Used in Greater Quantities in Buildings," *Society of Plastics Engineers Twenty-sixth Conference* (New York 1968). Statement by Product Control Supervisor Strother from South Florida.

[37] Sir James Stirling, statement to the second Iran International Congress of Architecture, 1974.

[38] Anthony Walker, *Modern Movement and Beyond* (Thesis, Architectural Association, London, 1993), 78-89. Author's discussion with Robin Nicholson, the original job architect, revealed that Stirling had originally wanted the building to be one colour, the yellow used internally. The striped effect came out of the planner department's insistence. The extruded image also explains why the detailing of the joint between panels instead of having a cover strip or overlap is a simple butt joint of adjacent panels relying initially on an evacuated tube seal even on the roof sections.

[39] Henryk Skolimowski, "Rationality in Architecture and the Design Process," *The Rationalists*, Dennis Sharp, editor (London, 1978), 160-172.

[40] John Gloag, "The influence of Plastics on Design," *Journal of the Royal Society of Arts* (23 July 1941): 462-470.

[41] Michael Collins, *Towards Post-Modernism* (London: British Museum Publications, 1987), 129.

[42] Ezio Manzini, *Domus*, no. 666 (November 1985): 54.

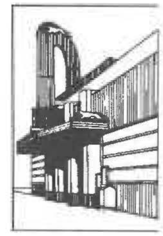
[43] Ezio Manzini, "Objects and their Skin," *The Plastics Age*, Penny Sparke, editor. (London: Victoria and Albert Museum, 1990): 118.

[44] David Cottam, *Owen Williams* (London, 1986), 84.

[45] *Architect Builder Contractor and Developer* (February 1993): 18. Quote from Frank Lloyd Wright in 1928.

[46] David Cottam, *Owen Williams* (London 1986), 7.

[47] Lionel Esher, *A Broken Wave* (London), 38.



Structural Glass:
Its History, Manufacture, Repair and Replacement

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Colored opaque structural glass was once widely used in this country. Although it is no longer manufactured in the United States, structural glass is still best known by the historic proprietary names of "Vitrolite" and "Carrara." This paper discusses the history, manufacture, and characteristics of structural glass and the repair and replacement options available today.

Colored opaque structural glass was fused at high temperatures, rolled into slab form, slowly annealed, and mechanically polished. Historically, the glass was marketed in black, white, and a variety of colors and finishes. The glass has also been known by many other terms, including recreated rock slab, sanitary glass, rolled or opaque opal glass, and heavy obscured structural glass. Besides Vitrolite and Carrara, other trade names included "Sani-Onyx," "Argentine," "Marbrunite," "Nuralite," and "Opalite."

Composition and Production

Opaque structural glass was composed of silica, feldspar, fluorspar, china clay, cryolite, manganese, and other materials vitrified with intense heat (about 3,000 degrees F).[1] The opacity of structural glass was created by the addition of fluorides into the batch. Upon annealing, the fluorides precipitated, creating a dense mass of particles suspended in the clear matrix. The fluoride particles would scatter, reflect, and trap light until the glass was semi-translucent or completely opaque. Colors were added to the clear matrix before firing.[2]

After the materials were vitrified in pots or tanks, the sheets were then rolled to the desired thickness much like plate glass.[3] The glass was annealed (cooled) much more slowly than modern plate glass, taking from three to five days - depending on the thickness.[4] The process demanded exact control of the temperature and speed of the annealing process in order to provide consistent opacity, color, and finish. The glass was sometimes "hardened" by use of rapid heating and cooling methods to increase its strength.[5] At this point the glass finish was "fire polished." Some applications made use of this soft finish without further polishing. To achieve a more glossy finished glass, the surface of the slabs were mechanically ground with fine sand and rollers and then polished to a mirror-like finish with felt blocks and rouge.[6] After polishing, the slabs were cut to size. Normally the material was cut, holes drilled, and the edges finished to the owner's specifications in the factory.

Early History and United States Production

The use of glass in imitation of other materials has a long history. Colored, semi-translucent glass was first developed in ancient Egypt and Rome in imitation of stone and marble. In the sixteenth century Venetian craftsmen were producing a semi-translucent glass by adding fluorides such as cryolite to the matrix. The Chinese also added cryolite to glass to produce an imitation porcelain.[7]

In the United States, at the end of the nineteenth century, the development of the regenerative furnace and the discovery of natural gas reserves in Pennsylvania, West Virginia, Oklahoma, Arkansas, Texas and Missouri led to a rapid expansion of US domestic flat glass production. The resulting investment of capital laid the foundation for varied innovations in technology and production of flat glass during the early twentieth century.[8]

Opaque structural glass slabs were first developed about 1900 as a sanitary alternative to white marble slabs for wainscoting or table surfaces. The product, Sani-Onyx, was created by the Marietta Manufacturing Company.[9] About the same time the Penn-American Plate Glass Company began production of Novus Sanitary Structural Glass.[10] By 1906 the Pittsburgh Plate Glass Company (PPG) had begun production of Carrara glass in white and black.

Eventually approximately ten US firms were producing structural glass, but the two products that dominated the market were Carrara and Libby-Owens-Ford's Vitrolite (which appeared on the market about 1916).[11] By 1929, US production of opaque structural glass was over five million square feet,[12] and the glass was being marketed in a variety of colors and finishes.

Although some structural glass was imported (primarily from Belgium and Czechoslovakia) imports constituted less than five percent of the US market.[13] Although the US discontinued production in the early 1960s, structural glass continues to be produced today in Czechoslovakia and Japan.[14]

Early Uses of The Material

When it was first introduced around 1900, structural glass was marketed as comparable to statuary marble in appearance, but, due to its smooth impervious surface and non-absorbent qualities, easier to clean and more sanitary. The fact that the glass was homogenous, non-porous, non-crazing, and could be produced in large sheets made it more appropriate than marble or tile for aseptic conditions such as hospital fixtures and surfaces.[15]

During the first two decades of the twentieth Century the material was primarily used in utilitarian locations requiring durable, non-staining, easily cleaned and maintained slab materials: wainscoting, flooring, refrigerator linings, lavatories, table and counter-tops, bank coupon desks, and electrical switchboards, and in places such as hospitals and bakeries. The ability of the material to reflect light without glare also made it suitable for corridors, operating rooms and laboratories.[16] In these years structural glass was also being used on exterior surfaces, especially storefronts, where it was substituted for stone in bulkheads and dados.

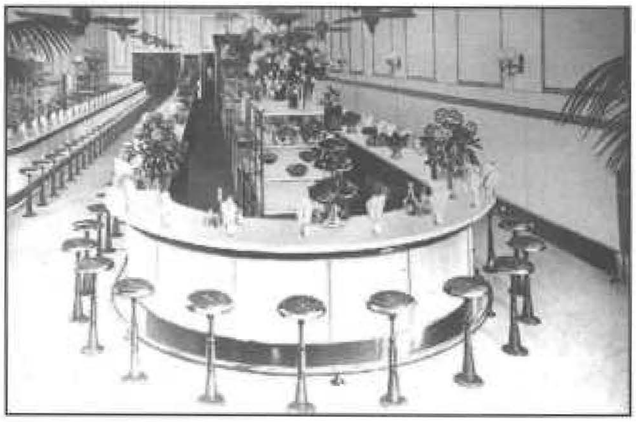
At the Peak of Popularity

Although as early as 1906, the Penn-American Plate Glass Company was producing their Novus Sanitary Structural Glass in various colors, up until about 1930 most structural glass was produced only in shades of white, off-white, and black.

The softer "fire polished" and "satin" (the more marble-like) finishes also predominated the early applications. By the 1930s, however, the glossy, colorful, mirror-like finishes became popular, being well-suited to the Art Moderne aesthetic.

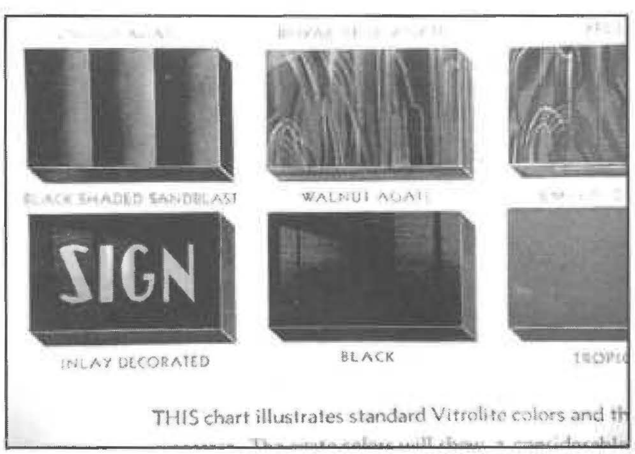
With the development of the new design aesthetics of Art Deco, Art Moderne, and Streamlined Modernism, structural glass reached its greatest popularity. The variety of colors and versatility of the glass led to its wide acceptance during the 1930s and 1940s. By the late 1930s structural glass was available in over thirty different colors ranging from pastels to jewel tones, and solids to striated "agate" and "dendric" patterns.[17] The material could be bent, carved, laminated, inlaid, and sandblasted, or painted with gold, silver or color at the factory. The glass was installed in sleek "moderne" office building lobbies, movie theaters, restaurants, and confectioneries, among other places. The glass also proved to be an ideal material for "modernizing" the exteriors of older structures.

New construction for storefronts, movie theaters, gas stations, and auto dealerships were clad in gleaming structural glass set in aluminum glazing systems. PPG produced their own complement to Carrara, Pittco-Carrara Glass Store Fronts, in which the metal window sash overlapped the Carrara facing material to protect the edges. In order to promote the use of Vitrolite in new construction, the Libby-Owens-Ford company offered a prefabricated Vitrolite-faced concrete masonry unit called Glastone. Opaque structural glass was no longer seen as a substitute for stone - it was extremely popular in its own right.

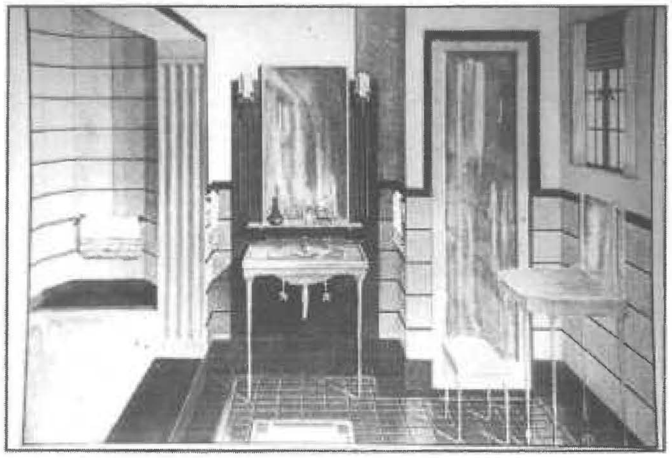


The sanitary, non-absorbant and non-staining material was popular for countertops, walls and fixtures in restaurants and food preparation areas. This restaurant had Carrara and Black Glass walls, wainscotting, counters, aprons and shelving. (Source: Glass, Paints, Varnishes and Brushes: Their History, Manufacture, and Use, 1923)

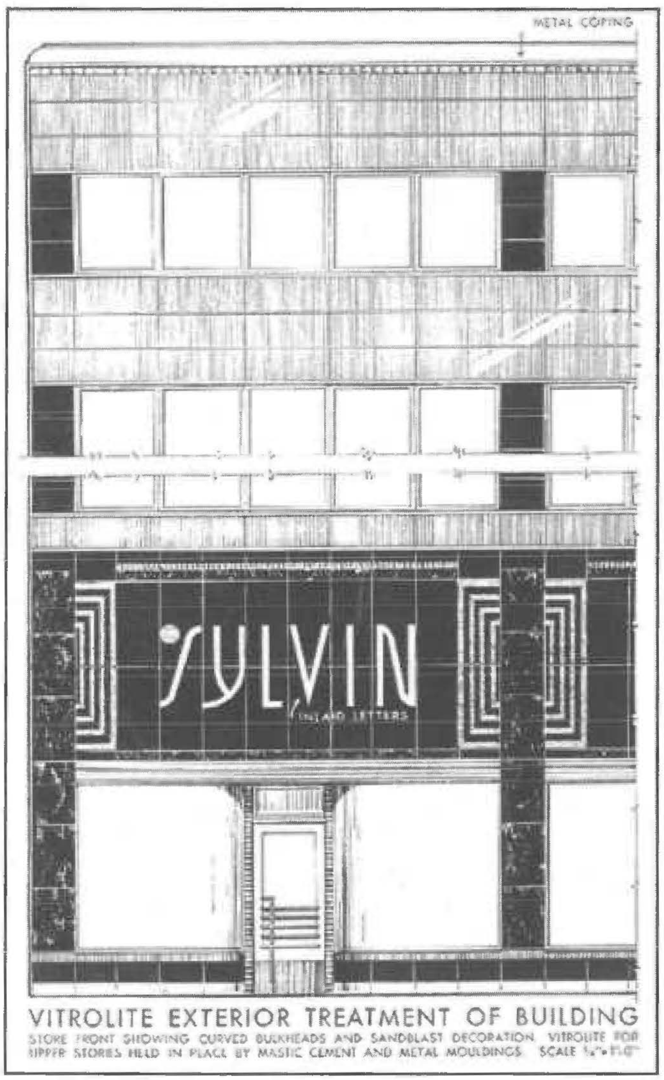
Early use of the material on building exteriors was in simple bulkheads and dadoes. The signage shown here was sandblasted and then painted. (Source: Glass, Paints, Varnishes and Brushes: Their History, Manufacture, and Use, 1923)



By the 1930s structural glass was being valued by designers for more than its easy maintenance and resemblance to stone. The versatility of the material (it could be bent, carved, sandblasted, inlaid, painted and came in a variety of colors and finishes) made it highly appropriate for the design aesthetics of the period. This illustration from the 1937 Sweet's Catalog File shows the variety of decorative finishes in which Vitrolite was available (Source: Sweet's Catalogue, 1937, 17/20, 1936.)



Inlaid letters, curved bulkheads and sandblasted decoration combine in this advertisement rendering to demonstrate the versatility of Vitrolite. (Source: Sweet's Catalogue, 1937, 17/20)

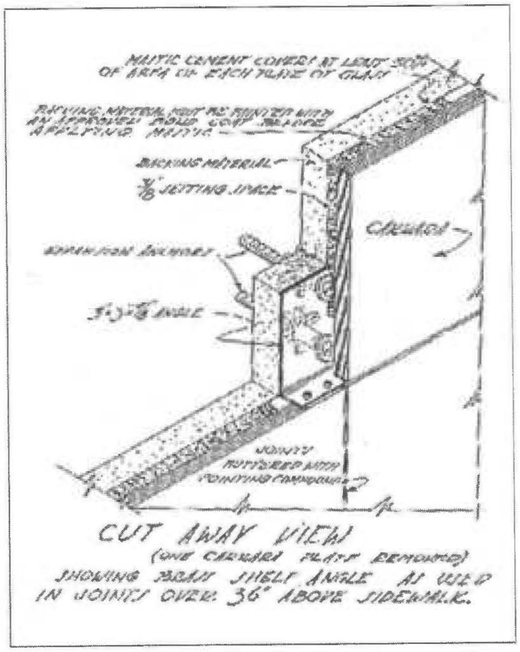


Structural glass was still being utilized in interiors, both commercial and residential. Unlike earlier period interiors where white, gray or black glass substituted for stone, now Polychromatic Vitrolite was used in residential restrooms and kitchens. (Source: Bathrooms and Kitchens of Distinction with Carrara: The Modern Structural Glass, circa 1935)

Late Use of the Material

By the 1950s structural glass was losing its popularity. Changing design tastes, and competition from other materials such as plastic laminates and ceramic panels, were eroding its market. Although still utilized for storefronts, structural glass advertisements in the 1950s now emphasized the same purpose for which it was originally designed: use in utilitarian spaces such as residential and commercial bathrooms and kitchens.

A 1959 Carrara brochure is the last time structural glass was prominent in *Sweet's Catalogue*.[18] In that edition, Carrara glass was being (unsuccessfully) marketed by PPG as a spandrel glass, and was available in the traditional "polished," "suede," and a new "rough" texture. Possibly the new coarse texture was designed to compete with other new materials such as textured porcelain enamel panels.[19] A 1963 PPG brochure on curtain wall systems discussing Carrara as a spandrel panel choice is the final time the material is seen in *Sweet's Catalogue*. PPG kept the trade name listed in the *Sweet's* index until 1969, but the material was no longer displayed.



The installation details for a typical Carrara veneer storefront are illustrated here. (Source: Glass and Storefront Products, 1940)

Material Installation

During its sixty-plus years of domestic production, structural glass was available in thicknesses from 1/4 inch to 1-1/4 inch. The panel sizes were determined by use. On exteriors the maximum size was six square feet if the panel was to be installed fifteen feet or more above the sidewalk, and ten square feet if installed below fifteen feet. Interior wall panels could be sized up to fifteen square feet. Toilet partition panels could be produced in sizes up to twenty-five square feet and were created by laminating two 7/8-inch slabs together with bituminous adhesives.[20]

The versatility of the material was partly due to its tolerance of various substrates. The glass could be readily applied to most flat surfaces, including plaster on metal lath, concrete, or masonry. Wood substrates, however, were discouraged. The backing surface was prepared and sealed with a bonding coat supplied or approved by the glass manufacturer. The mechanical fasteners (non-ferrous metal brackets, angles or channels) were secured to the substrate. The panels were pre-fabricated at the factory to specifications and were attached with an asphaltic mastic. The mastic was applied to the back of the glass in three-inch daubs covering fifty percent of the back of the panel. The glass was set in position by rocking the panel until the flattened mastic was forced into the back-up surface providing a keying action. When the cement was set, the joints were pointed with a pointing cement, which, like the mastic, was provided by the glass manufacturer. Panel edges could be protected with 1/16 inch thick cork tape, which was set back 1/8 inch from the front of the glass.[21] In locations where high moisture was expected (such as tub surrounds) and the backup substrate was masonry, the panels were sometimes attached with cement rather than mastic. On exteriors, non-ferrous angle irons or clips helped hold the panels in place.

Condition Assessment

Much of the popularity of opaque structural glass was due to its durability. The glass does not warp, craze, fade, or easily stain, and resists most acids. When structural glass panels do fail, it is from either impact or deliberate alterations (such as installation of new fixtures) and is manifested in cracks, holes and chips.

Because 1) the material is non-absorbent, 2) most fasteners for structural glass are non-ferrous, and 3) the plastic nature of the mastic is forgiv-

ing, there is less reason for severe deterioration from moisture than with clay-based masonry products. The mastics and pointing cements are the weak link in the system. Although the mastics are durable, they harden over time. The pointing cements also gradually deteriorate. The dark shades of structural glass absorb a significant amount of heat, causing the panels and walls to be subjected to more thermal stress. Although they were often heat-tempered, the joints on dark facades are exposed to more thermal expansion and contraction.

Most failures in structural glass systems are readily obvious: panels are visibly cracked, damaged, missing, out of alignment, or delaminating, joints are deteriorated, or water intrusion is evident. Because most exterior installations are below fifteen feet, the panels are easily accessed. One can gently push on a panel to see if it is still securely adhered to the substrate. If a wall has been subjected to severe water damage, then removal of selected panels may be necessary to determine the stability of the mastic and the substrate.

Conservation Techniques

Because structural glass is no longer produced in the US, repairing, whenever possible, rather than replacing, is the best approach. Maintenance of structural glass is straightforward. The glass can be cleaned with water and ammonia or detergent. Joint repair can be done with traditional joint cement (with an integrated watertight surface), latex caulking, or glazing compound.[22] Silicone sealant is reportedly harder to control due to the fine joints.[23] Traditionally, joint cement was colored to match the glass. New materials should also be tinted to match, with pigments compatible with the joint patching material.[24]

Minor hairline cracks can be filled with caulking tinted to match the glass. One method for repairing chips or holes is to fill the defect with polyester resin adhesive tinted to match the glass. The surface can then be polished with fine sandpaper and buffed with polish.[25] Tim Dunn of Vitrolite Specialist, a St. Louis contracting firm that specializes in the restoration of this historic glass, has had success filling the hole with glazing compound and then painting the area with computer color-matched paint.[26]

Removal

Removal of structural glass panels is difficult due to the gradual hardening of the mastics and the fine joints between panels. Two publications on structural glass, Douglas Yorke's article in *The Association For Preservation Technology Bulletin*, "Materials Conservation For The Twentieth Century: The Case For Structural Glass," and the National Park Service's *Preservation Brief No. 12*, "The Preservation of Structural Glass" have excellent discussions of the repair and removal of structural glass panels.[27]

No method is immune to glass breakage. Commercial solvents can be injected behind the glass to soften the mastic. Then piano wire can be slipped behind the panels to cut through the mastic.[28] Another method, reportedly effective but time consuming, is to direct steam for approximately ten minutes at the face of the panel to soften the mastic. The panels can then be pried or sawn off. When prying glass panels off, a block of wood should be used to protect the face of the glass from the crowbar or nail puller.[29]

In-kind Replacement

Colored opaque structural glass is no longer manufactured in the United States. When pieces are broken, severely damaged, or missing, finding an appropriate replacement material is difficult.

However, when structural glass manufacture was discontinued, many glass shops were left with large inventories. Occasionally shops still have stock left in warehouses today. Salvage of used material is difficult but a few architectural salvage yards, or glass repair specialists, may be able to locate a supply. Karl Platt, a glassmaker and preservationist in Milton, Virginia, has a substantial stockpile of structural glass he has purchased from glass shops over the years.[30]

One kiln in Czechoslovakia still produces structural glass in the traditional method. The material is distributed in the United States by Floral Glass and Mirror of Hauppauge, New York, but there are limited choices in size, colors, and finishes.[31] The panels are sized metrically and are approximately 1/4 inch thick. They are produced in black, white, mint green and beige. Differences in the panel thickness may be adjusted for with the mastic and mechanical fasteners. Metric panels could be cut down to fit the necessary English dimensions.

Japan has at least two new products that are similar to historic structural glass. NEG Industries' NeoClad is an opaque colored glass that comes in white, beige, and gray colors. ASAHI Corporation is producing an opalescent, nearly

More than one Japanese firm is producing colored structural glass today. This photo is of a interior application of NEG's NeoClad. (Source: "Exclusively NeoClad, Architectural Panels," Nippon Electric Glass Co., Ltd., Glass and Storefront Products, 1940)

opaque structural glass in white and light gray. As with the Czechoslovakian glass, limited colors, metric sizes, and the cost of shipping to the United States, make matching the size, strength, finish, reflectivity, and color of domestic glass problematic.[32]

Substitute Materials
Another glass material that is often suggested as a substitute material is spandrel glass (back-enameled clear glass). With the advent of computer color-matching, back-painted or back-enameled glasses may be adequately matched in color. The clear depth of material, however, does not provide an appearance of homogenous opacity, and ultraviolet light may fade the colors. Experience has shown that the edges of the glass are visible, which emphasizes the lack of true opacity. Polishing and painting or enameling the edges to match the back could help solve this problem.

Mary Oehrlein of Oehrlein and Associates, Architects, in Washington, DC has researched various materials as substitutes for structural glass. One product she has suggested that holds promise is laminated glass.[33] In a custom job, the translucent, colored polyvinyl inner layer(s) can be laminated a mere 1/8 inch from the outer face of the glass and might suggest the desired color opacity.[34] The combination of colored translucent interlayers and back-painting might produce a material more similar in appearance to structural glass.

The replacement of 1-3/4 inch freestanding laminated partitions, such as those used in lavatories, poses a special problem because most in-kind replacement materials are thinner. The use of solid-surfacing materials such as those used for present-day counter tops, if polished, has also been suggested. Once again, color (solid black is currently unavailable) and reflectivity are issues.[35] Another substitute material that has worked in some cases is colored or back-painted polycarbonate sheets. Of the "plastic" materials - Lucite, Plexiglass, and Lexan - the latter is a polycarbonate and reportedly the least susceptible to scratches.

Conclusion
To conclude, there are no perfect substitutes for historic structural glass. Good maintenance of existing facades and safeguarding extant stockpiles are of great importance to the future survival of this endangered material.

Notes

[1] Charles Merrick Gay and Harry Parker. *Materials and Methods of Architectural Construction* (New York, New York: John Wiley & Sons, Inc., 1932), 236.

[2] Raymond McGrath, A.C. Frost, and B.A. Cantab. *Glass in Architecture and Decoration* (London: The Architectural Press, 1937), 47.

[3] Ibid., 46.

[4] *Glass, Paints, Varnishes and Brushes* (Pittsburgh, Pennsylvania: Pittsburgh Plate Glass Company, 1923), 159.

Carrara Colorful Structural Glass (Pittsburgh Plate Glass Company, 1959), 2.

[6] McGrath, 37, 46.

[7] Ibid.

[8] *Flat Glass and Related Glass Products*, Report No. 123, second series (Washington, DC: United States Tariff Commission, 1937), 20.

[9] *The Preservation of Historic Pigmented Structural Glass, Preservation Briefs 12*, (Washington, DC: US Department of the Interior, National Park Service, Rocky Mountain Regional Office, Cultural Resources Division, February 1984).

[10] *Sweet's Indexed Catalogue of Building Construction* (New York, New York: Architectural Record Company, 1906), 388, 441.

[11] *Sweet's Catalog of Building Construction*, 1916.

[12] *Flat Glass and Related Glass Products*, 137.

[13] Ibid.

[14] See the discussion in the "In-Kind Replacement" section of this paper.

[15] *Sweet's Indexed Catalogue of Building Construction*, 1906, 441.

[16] *Glass, Paints, Varnishes and Brushes*, 164.

[17] *Sweet's Architectural Catalogues*, Volume B, (New York, New York: F.W. Dodge Corporation, 1930), B2310.

[18] *Carrara Colorful Structural Glass*, 2.

[19] Ibid.

[20] Flat Glass Jobbers Association, *Glazing Manual, Specifications for Installation of Flat Glass*, (Chicago, Illinois: R.R. Donnelley and Sons Company, 1958), 67-8.

[21] Ibid.

[22] Geier Brown Renfrow Architects with Oehrlein and Associates, *Historic Structures Report, Department of Justice Building*, Chapter 10: Outline Specifications (Washington DC: General Services Administration, National Capital Region, 1989), 490-1.

[23] Tim Dunn, Vitrolite Specialist, St. Louis, Missouri, personal communication, September 1994.

[24] Geier Brown Renfrow Architects with Oehrlein and Associates, 490-1.

[25] Ibid.

[26] Tim Dunn, personal communication, September 1994.

[27] For detailed preservation information on the removal and repair of historic structural glass panels see *The Preservation of Historic Pigmented Structural Glass*, 6, and Douglas A. York, "Material Conservation for the Twentieth Century," *Association for Preservation Technology Bulletin* 23 (1981), 18-29.

[28] Ibid.

[29] *The Preservation of Historic Pigmented Structural Glass*, 6.

[30] Personal communication with Karl Platt, Milton, Virginia.

[31] The Czechoslovakian structural glass is available as follows: colors - black, white, beige, and mint green; thickness - approximately 1/4 inch; source - Floral Glass and Mirror, 895 Motor Parkway, Haupauge, New York, telephone 800-647-7672 or 516-234-2200.

[32] The two Japanese structural glasses are available as follows. Japanese opaque structural glass: product name - Neoclad; colors - white, beige, and gray; thickness - 0.5mm to 7.5mm; source - NEG America, Inc., 650 East Devon, Suite 110, Itasca, Illinois 60143, telephone 800-733-9559. Japanese structural glass: product name - New Sunprito; colors - white and light gray; thickness - 5mm to 9mm; manufactured by ASAHI Glass Company; source - The Sentinel Group, PO Box 399001, Miami Beach, Florida 33139, telephone 800-827-7848.

[33] Mary Oehrlein, Mary Oehrlein and Associates, Architects, Washington DC, personal communication, January 1993.

[34] Personal communication with Monsanto Chemical Company regarding the Saflex OptiColor system.

[35] Mary Oehrlein, personal communication, January 1993.

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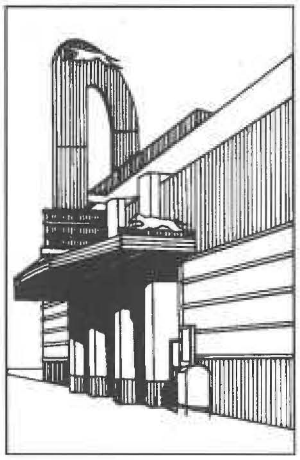
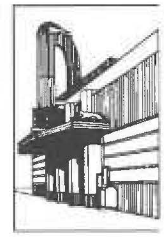


Pushing the Envelope



Porcelain Enamel: Steel in "Glass Clothing"

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Introduction
One of many composite building materials introduced in the twentieth century, porcelain enamel is glass fused to metal at a high temperature. Porcelain enamel is an inorganic composition, and is sometimes referred to as "vitreous enamel" to avoid confusion with organic-based enamel paints. Although many substrates including cast iron, steel, stainless steel, copper, and aluminum have been used historically, steel is the most prevalent.

The development of porcelain enamel as a construction material can be traced to the mid-1920s in the United States. From that time forward, a range of products - shingles, tiles, siding, and panels - were introduced and accepted with varying degrees of success by architects and builders. This paper discusses the evolution of porcelain enamel building products, outlines basic deterioration mechanisms, and describes approaches to conserving, repairing, and replacing porcelain enamel components.

The Beginnings of Porcelain Enamel As a Building Material
Enameling of sheet iron has its origins in Germany and Austria in the middle of the nineteenth century. The cast iron enameling industry developed in the U.S. in the last quarter of the nineteenth century, and by the 1920s porcelain enamel appliances, kitchenware, and bathroom fixtures were common.[1] In 1909, the American Rolling Mill Company introduced "enameling iron," a low carbon steel suitable for enameling, which marked the beginning of the modern enameling industry in the U.S. Viable commercial markets for porcelain enamel building products, however, did not emerge until the late 1920s.

While porcelain enamel panels eventually dominated the market, shingles and tiles were also developed in the mid-1920s. Around 1890, Theodor Bergmann, the owner of an enameling factory Stuttgart, Germany, applied porcelain enamel sheets resembling shingles to his villa. This is the earliest known architectural application of porcelain enamel. Bergmann displayed his enamel shingles at the 1893 World's Columbian Exposition in Chicago, but it does not appear that shingles were available or produced in the U.S. until 1924.[2] That year the Columbian Enameling and Stamping Company, based in Terre Haute, Indiana, covered a house with its recently developed "Porcelite" shingles.[3] The Vitrified Metallic Roofing Company in Detroit also produced shingles as early as 1924. This shingle was originally patented by roofing contractor Neil Burgett, but the rights appear to have been purchased by the Glasiron Products Company (later Wolverine), which became a long-time producer of this product.[4] Howard Johnson's, for example, used a bright orange shingle produced by Wolverine beginning in the late 1930s (Figure 1).

Porcelain enamel tiles, produced to compete with ceramic tiles, were introduced by the Chicago Foundry Company and the Porcelain Tile Company, also based in Chicago, in 1925. Some tiles were attached with lugs and screws, while others were cemented in grooved fiber wallboards. The Porcelain Tile Company originally sold its Porstelain tile in two sizes: 4-1/2 inches by 4-1/2 inches and 3 inches by 6

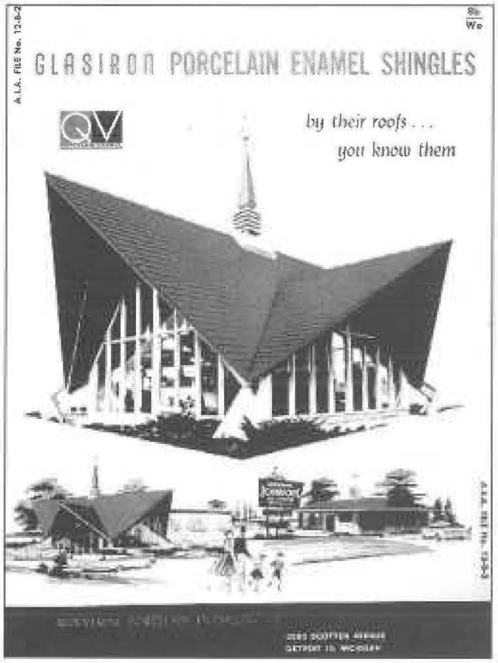

Figure 1. Glasiron Porcelain Enamel Shingles, produced by the Wolverine Porcelain Enameling Company, for Howard Johnson's. (Luther Ray Archive, Library of Congress)

inches. When the rights to this product were sold to the Youngstown Pressed Steel Company in the early 1930s, the trade name was changed to Veos, an acronym for vitreous-enamel-on-steel. The Veos tiles were used in some of the houses built in Levittown, Pennsylvania.[5]

Porcelain Enamel Panels

Panel systems represented the single most successful new porcelain enamel building product. Sheets were probably first pioneered by the White Castle restaurant chain. In 1925, the company constructed a store in St. Louis with a porcelain enamel interior. Impressed with the material, White Castle constructed a store in Wichita, Kansas, with porcelain enamel panels on the exterior and interior in 1929.[6]

With the organization of the Porcelain Enamel Institute in 1930, manufacturers sought to expand markets for porcelain enamel, including construction. To promote porcelain enamel as a construction material, the Ferro Enamel Corporation constructed the "world's first porcelain enamel house" in 1932.[7] Built outside Cleveland, the house had a porcelain enamel roof, chimney, shingle siding, wall and lighting fixtures. Ferro built a second house the next year in Solon, Ohio. At the 1933 Century of Progress Exposition in Chicago, two porcelain enamel houses were erected: the Stran-Steel House and the Armco-Ferro House. The Armco-Ferro House, which had thirteen-inch wide sheets attached with metal battens, was later moved to the Indiana Dunes National Lakeshore, where it still stands (Figure 2).

Because the material was easy to clean, flat and "modern," resisted abrasion, and remained color-fast, porcelain enamel panels gained acceptance for use in gas stations, restaurants, and storefront remodelings. By 1939, the number of manufacturers offering architectural panels was four times greater than the number in 1937.[8]

Panels were generally manufactured with 16, 18, or 20 gauge sheet metal. Prior to being fired with enamel, sheets could be punched, sheared, welded, drawn, and cut to form grills, louvers, steps, clips, and flanges. Enameling iron, characterized by a coefficient of thermal expansion close to that of the ceramic coating, was used for optimum adherence. Panels sizes ranged from two feet to three feet wide, to no more than five feet in length.

Although manufacturers frequently offered some standard size components, porcelain enamel has never been considered a standardized building material. Almost all panels were custom designed, manufactured from shop-drawings, and installed sequentially by contractors. Many of the panel systems were proprietary, such as the key-lock system developed by White Castle, or the concrete-backed system sold by Maul Macotta in Detroit. Cores for the panels also varied, and included such materials as plywood, fiber wallboards, polystyrene, and paper honeycomb.

Panels were fastened to masonry, wood, and steel backup with a variety of attachment systems. Simple sheets could be held in place with screws and battens. By 1937, flanged panels, also called "pans," began to dominate the market. A dizzying array of attachments systems were in use, ranging from screws, springs, hooks, clips, lugs, to clamps[9] (Figure 3). After erection, joints were caulked.

Material Advances and the Rise of the Curtain Wall

Following World War II, porcelain enamel

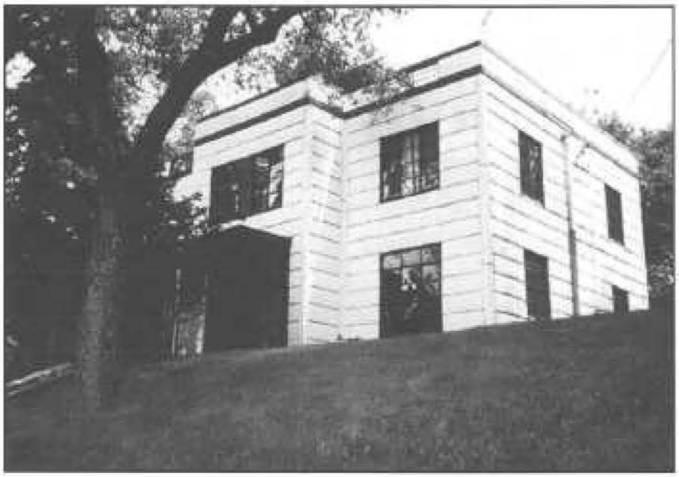

Figure 2. Armco-Ferro House at the Indiana Dunes National Lakeshore. (Photo courtesy of Frederick Lindstrom)

continued to make advances in the field of construction and was used for schools, toll-booths, office buildings, and housing. The Lustron Corporation, for example, manufactured about 2,500 houses made entirely of porcelain enamel between 1947 and 1950.[10] However, the real growth in the industry soon became panels for curtain wall construction.

New formulations that improved opacity enabled manufacturers to develop products with thinner enamel coatings. One such product was Mirawall, a wall covering referred to as "enamel wallpaper"[11] (Figure 4). Mirawall was a thin, 0.02 inch thick coating of porcelain enamel on 0.01 inch thick steel sheets backed with Masonite, a fiber wallboard. Used widely for walls in diners, supermarkets, and hospitals, Mirawall signalled the growing trend in architectural enamels that would be used in curtain wall systems: thin coatings of enamel laminated to a core material. In fact, the Mirawall Company later developed a curtain wall panel based on this technology.

Low-temperature enamel coatings were another important development, enabling porcelain enamels for aluminum. The Kawneer Company, based in Niles, Michigan, pioneered the process in 1950, collaborating with Dupont and Alcoa, among others.[12] Kawneer's Zourite products were used in storefronts. Enameled aluminum was also widely used for signs.

The first true curtain wall in porcelain enamel was designed by Eero Saarinen in 1950 for the General Motors Technical Center in Warren, Michigan.[13] These spandrel panels were made with 16 gauge metal laminated to a paper honeycomb core. Panels were typically insulated to offer desirable thermal properties, rigid to control wind stresses, and sealed to prevent water and vapor transmission.[14] By the mid-1950s, porcelain enamel sandwich panels, or composite panels, had become an accepted curtain wall material (Figures 5 and 6).

Manufacture and Fabrication

Manufacture of porcelain enamel components involves the application of a mineral composition to a metal substrate, most frequently steel. The enamel, sometimes referred to as frit, is a mixture of minerals (silica, feldspar, and quartz), fluxes (borax, soda ash), and opacifiers (various oxides). These raw materials are smelted, cooled rapidly, and ground in a mill. Acid-resistant formulations were developed in the mid-1930s for exterior uses.

Today, enamels are applied using an electrostatic process, but two methods - a dry and a wet process - have been used historically to apply the enamel to the metal. In the dry process, commonly used for cast iron, frit was applied to the heated metal through a sieve. More commonly employed for architectural enamels was the wet process in which the frit was suspended in an slip (emulsion) of water and clay. To apply the enamel, components were either sprayed or dipped. Ground coats were typically dipped, forming the bond with the metal; one or more cover coats were sprayed on to provide

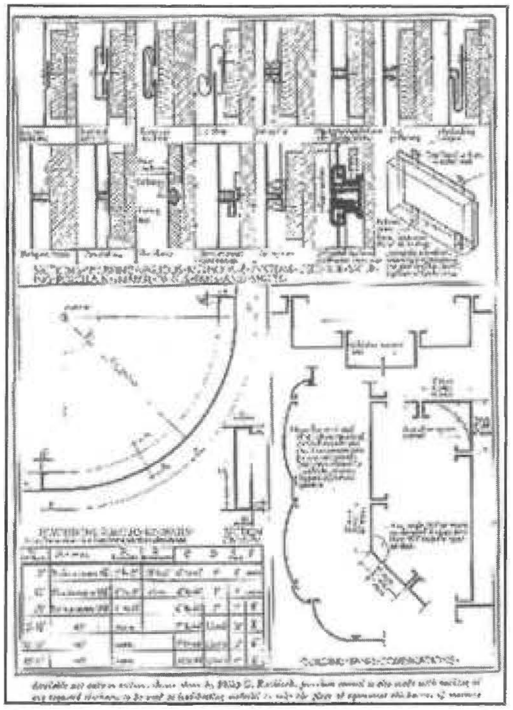

Figure 3. Common Attachment Systems for Porcelain Enamel. Architectural Forum (May 1939).

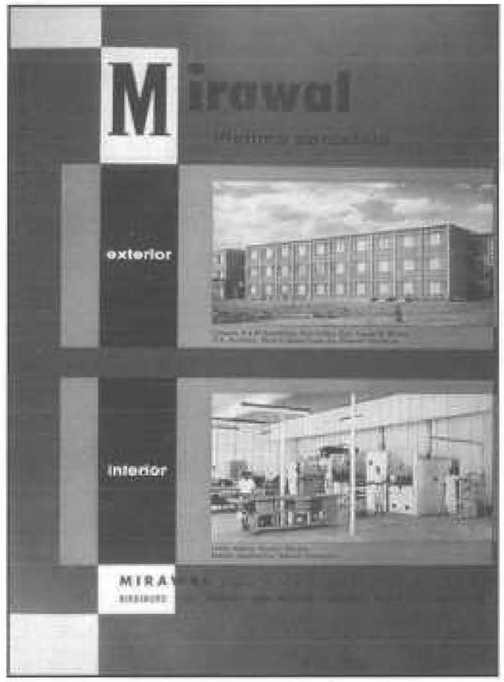

Figure 4. Mirawall Company Products. (Luther Ray Archive, Library of Congress)

opacity, color, and acid resistance. Firing at temperatures in excess of 800 degrees completed the manufacturing process. Early enamels ranged in thickness from approximately 0.015 inch to 0.02 inch.

Architects could specify a range of colors and finishes. Glossy finishes predominated in the late 1930s; matte finishes were later introduced, but they were not widely used until the early 1960s. Textured finishes - sometimes combining more than one color - were created using mottling and stippling techniques. The "oatmeal" mottle, for instance, was popular in the late 1940s and was used by Kresge (later K-Mart) (Figure 7).

Preservation Issues

Few, if any, time-tested methods for conserving and repairing porcelain enamel building products exist at this time. In the absence of documented methods, porcelain enamel should be approached like any historic building material. By carefully documenting the material being conserved, studying the deterioration mechanisms and potential repair materials, respecting the material as it changes over time, and selecting techniques that limit intervention, sensitive conservation and repair techniques can be developed.

The durability of porcelain enamel is influenced by numerous factors, including environmental conditions, quality of fabrication, inherent stresses and strains, and maintenance practices. A non-porous material, porcelain enamel is resistant to most organic solvents and has good abrasion resistance.

Although pitting of the glass surface is not common, weathering can occur in seacoast and highly corrosive industrial environments. Physical and chemical changes in the panel surface may appear as hazing - reduced gloss and color loss. Extensive testing by the National Bureau of Standards (now the National Institute of Standards and Technology) demonstrated that the most weather resistant panels are those that resist acids. Tests revealed a strong correlation between color and gloss retention, and acid resistance.

Corrosion of the base metal is the most common form of deterioration (Figure 8). Corrosion can be caused by impact or manufacturing defects when components are not adequately covered. Water infiltration through missing joints can exacerbate corrosion.

When the bond between the glass and metal is

Figure 5. Typical Curtain Wall in Porcelain Enamel Used in an Office Building, Arlington, Virginia. (Photo by Thomas C. Jester)

fractured, the substrate is exposed. Ceramic engineers have theorized that hydrogen diffusion through exposed steel from condensation can create enough pressure to cause spalls in adjacent areas.[15] However, in many instances, the surrounding enamel remains firmly adhered to the substrate.

The nature of stresses and strains between the glass and metal is dictated by the formulation and each material's coefficient of thermal expansion. Stresses and strains can cause crazing, chipping, fishscaling, and warping.[16] Usually these defects are manufacturing-related. Thicker, less flexible coatings are more susceptible to fracture.

Repair Techniques

Prior to making any repairs on porcelain enamel, the cause of deterioration should be identified. It is useful to review construction documents that may reveal the type of attachment system, core, and original caulking material. If panels appear loose, it may be necessary to selectively remove panels by cutting the fasteners with a reciprocating saw to make a proper condition assessment. Tape should be placed on the edges of panels being removed to prevent chipping.

A common question is whether it is possible to re-fire weathered panels. While manufacturers sometimes make in-process repairs, the techniques are complex and neither economically practical nor reversible. Slightly faded panels are usually still serviceable and generally do not require replacement.

Simple maintenance procedures for porcelain enamel include routine checks to make sure joints are sealed, and cleaning. Cleaning can be undertaken with clean cloths and warm water with a one percent solution of trisodium phosphate. Large-scale installations may require low-pressure water cleaning. Stubborn dirt can be carefully removed with a razor blade or by using calcium carbonate in water as a mild abrasive. To avoid etching the surface, small test patches should be cleaned first.

Oils and grease can usually be removed with alcohol-based solvents. Paints can be removed with either a moderate pressure water rinse with detergent, or non-caustic proprietary strippers that are environmentally safe.[17]

Exposed and corroded areas on panels should be repaired by removing rust and applying a protective coating. Irreversible repair techniques that require etching the entire panel face should be avoided, as such techniques alter the original finish.

Three types of coatings have been used for porcelain enamel in various service conditions: epoxies, urethanes, and lacquers. Many of the proprietary techniques for refinishing porcelain enamel bathroom fixtures are based on urethane treatments that require surface etching. Lacquers have been used to repair porcelain enamel signs. However, these coatings may not offer adequate color retention, adherence properties, or ability to withstand ultraviolet light.

Epoxy coatings that are surface-tolerant may be more effective in the long-run. Such epoxies do not require a perfect, bright metal surface to be effective. When using this technique, rust should be removed with a wire brush or Dremel tool, protecting surrounding enamel surfaces. A durable paint, such as an asphaltic urethane, can then be applied to the affected area in a color matching the original finish.

Fiberglass filler materials, formulated for automobile body repair, have been used experimentally to infill chipped areas.[18] Unfortunately,

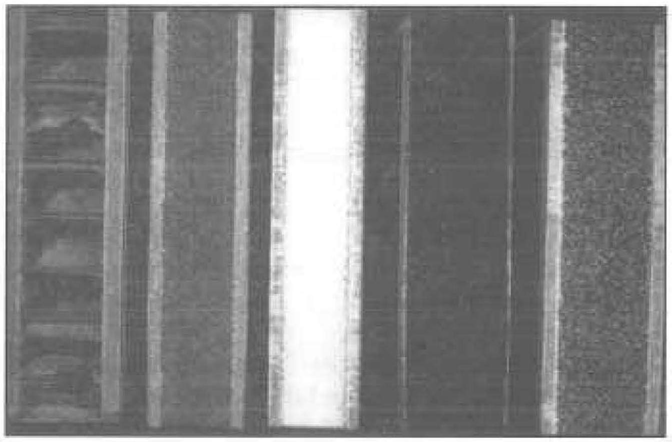

Figure 6.Mirawall Composite Panel Core Types. From left to right: Paper Honeycomb, Fire Wall, Urethane, Foamglass, Styrofoam. (Photo by Tom Jester. Samples courtesy of National Building Museum)

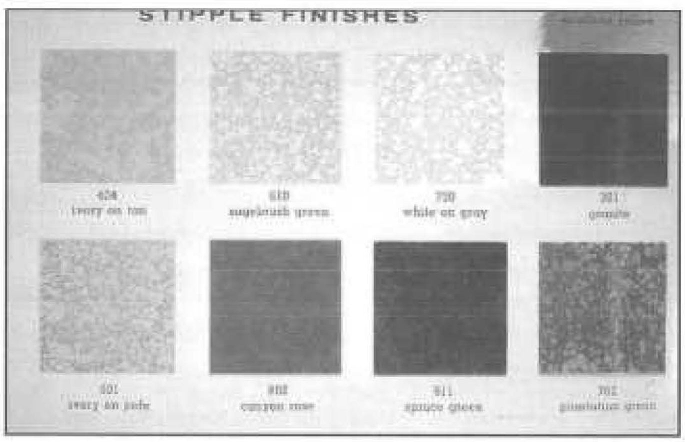

Figure 7. Stippled finishes were widely used in the 1940's. (Courtesy of National Building Museum)

it is apparently difficult to achieve a good color match and avoid abrading the adjacent glass surfaces. Also, the long-term performance of these materials is unknown.

Replacement

When replacement panels are needed, custom panels matching the historic color can be manufactured. It may be possible to manufacture replacement shingles and tile, but the economies of scale will make it difficult to obtain only a few replacement components, so the cost may be prohibitive.

Solid color components are the easiest to match. Matching stippled and mottled finishes may be prohibitively expensive, since the manufacturer, not the architect, contractor, or conservator, must experiment with formulations. For a list of US and Canadian manufacturers of architectural panels, contact the Porcelain Enamel Institute in Nashville, Tennessee.

Custom-designed panels are typically inserted with shortened through-joint fasteners (Figure 8). The final step in the replacement process is sealing perimeter joints with a sealant that matches the existing sealant in color, texture, and profile.

Conclusion

Porcelain enamel has a distinctive history as a modern building material. Once viewed as a material suitable only for hamburger stands and gas stations, it evolved into a complex composite material for a wide range of applications that

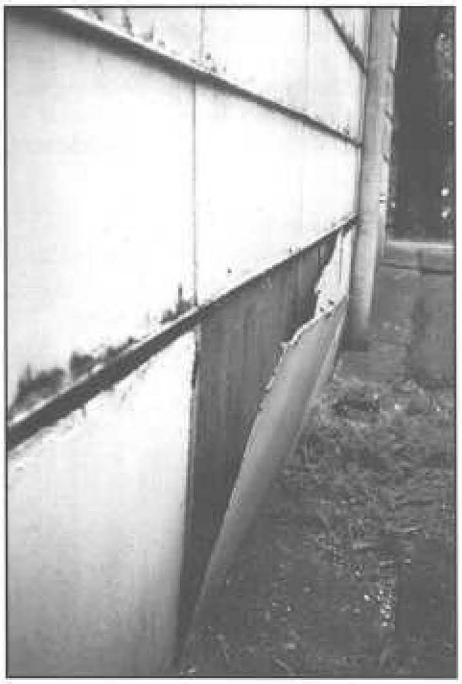

Figure 8. Corrosion of the metal substrate is a common form of deterioration. Photo courtesy of Frederick Lindstrom.

continue today. Porcelain enamel is one of many composite building materials that the preservation community will encounter with greater frequency as buildings from the recent past require preservation, rehabilitation, and restoration. Additional research is still needed on the historical development of porcelain enamel building products, and on potential conservation treatments and repair methods.

Notes

[1] A.I. Andrews, *Porcelain Enamels* (Champaign, Illinois: Garrard Press, 1961), 6.

[2] Moses P. Handy, *The Official Directory of the World's Columbian Exposition* (Chicago, Illinois: Conkey Co., 1893), 280.

[3] LeRoy W. Allison and Malcolm B. Catlin, "The Place of the Porcelain Enamelled Steel House," *Iron Age* 134 (13 September 1934): 18.

[4] "Porcelain Enamel Tile Makes Appearance in Detroit," *Ceramic Industry* 5 (1925): 532-33.

[5] "Veos Wall Tile," Box 3, Luther Ray Archive, Library of Congress.

[6] L.W. Ray, "An Early Headache Becomes a Practical Movable Building," *Finish* 5 (June 1948): 20. These panels were enameled by a company in Granite City, Illinois (probably the National Enameling and Stamping Company).

[7] "House to Have Porcelain Enamel Siding on Insulated Sheets," *Iron Age* 132 (14 July 1932): 74.

[8] D.H. Grootenboer and Don Graf, "A Material of Versatility," *Pencil Points* 20 (March 1939): 195-196; *Enamel Trade Directory* (Chicago, Illinois: Ceramic Publishing Company, 1937), 139.

[9] "Architectural Porcelain Enamel," *Pencil Points* 66 (May 1937): 459. See also, Carl F. Block, "Attaching Porcelain Enamel Panels," *Sheet Metal Worker* 39 (June 1948): 106-109.

[10] Tom Wolfe and Leonard Garfield, "A New Standard of Living: the Lustron Home," in Camille Wells, ed. *Perspectives in Vernacular Architecture* 2 (Columbia, Missouri: University of Missouri Press, 1986), 51-60.

[11] H.D. McLaren, "Porcelain Enamel as a Protective Finish," *Enamelist* 26 (1949): 12.

[12] "Kawneer Enamels Aluminum for Profit," *Ceramic Industry* 55 (November 1950): 55-56.

[13] William Scarlet, "Smooth Skin," *Construction Specifier* 44 (June 1991): 67.

[14] "How Should the Curtain Wall Perform?" *Ceramic Industry* 65 (December 1955): 53.

[15] Dwight G. Moore and William N. Harrison, "Fifteen-Year Exposure Test of Porcelain Enamel," *Building Materials and Structures Report* 148 (28 June 1957): 3.

[16] Andrews, *Porcelain Enamels*, 67-68.

[17] An example is the series of PEELAWAY products manufactured by Dumond Chemicals, 1501 Broadway, New York, New York 10036.

[18] Robert A. Mitchell, "What Ever Happened to Lustron Homes," *APT Bulletin* 23 (1991): 49-50

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From Beer to Buildings: The Curious History of Glass Masonry

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A Brief and Incomplete History of Glass Masonry

The words "glass block" conjure up different images in the minds of architects and laymen. In this case, the relative ignorance of the layman may be a virtue. When asked to define glass block, architects often think broadly, incorporating every glass building product that isn't thin and available in broad flat sheets. Wrapped up in the professional's idea of glass block are hollow and solid masonry units, decorative glass of all descriptions - including cast glass such as Lalique's windows at the Francois Coty store (1904) on Fifth Avenue in New York - prismatic glass, such as that made by Luxfer, sidewalk lights, and the heavy glass plates often used as flooring in library stacks. This definition may not be accurate, but because it is frequently complemented by an intelligent fondness for the possibilities of the material, it is hard to fault. The layman, on the other hand, when asked the same question often describes a squarish block of indeterminate thickness - perhaps it's a cube - that is reminiscent of a brick or concrete block and characteristic of industrial buildings of the 1930s or basement rec-rooms of mid-century suburban ramblers. This is an aesthetic most, not surprisingly, are not quick to espouse.

There is no formal definition of what is and what is not a glass block, but for the sake of limiting the discussion and imposing some order on a group of materials that tends to defy classification - is it glass or is it masonry - the scope of this paper is restricted to the layman's concept, which fairly accurately describes commercially manufactured hollow and solid glass masonry units.

Great Gobs of Glass: Prototypical Glass Block

The antecedent of modern glass block appeared in Europe and the United States in the nineteenth century when solid chunks of lenticular glass were set in concrete or metal frames and used to further the aesthetic and practical end of bringing light to abandoned corners of buildings. The simple lenses of the early structural glass evolved into at least two commercial products. One, prismatic glass, was designed to provide daylight in the center of the larger and larger floorplates that typified buildings of the late nineteenth and early twentieth centuries.[1] A second was hand-blown hollow glass block. Patents for hollow glass block date back as early as 1886, when Gustave Falconnier was granted a French patent for his novel use of glass.[2] Hand-blown from a bottle green glass, Falconnier's blocks were prone to internal condensation problems caused by the presence of moisture, from the glassblower's breath, in the hollow cavity. Structural stability was another problem with these blocks: their lozenge shape was developed to reduce stress in the corners of the block. Falconnier's block, despite these continuing problems, was frequently used as both a roofing and siding material at the turn of the century.[3] While most buildings incorporating this material were in Europe, particularly in France, the greenhouse in front of the horticultural building at the 1893 Chicago World's Columbian Exposition was constructed with Falconnier's block.[4]

But it was Friedrich Keppler, a German-born architect, who developed the most practical and durable system of erecting glass block partitions.

Keppler, who emigrated to the United States in the 1880s, worked as an architect in Chicago and as a representative of the American Luxfer Prism Company in the 1890s before that company sent him to Germany as its representative. There, as director of the Deutsche Luxfer Prismen-Gesellschaft (German Luxfer Prism Company), he was exposed to the European development of glass block. While in Germany, Keppler devised a method of integrating a matrix of glass prisms and reinforced concrete for use as interior paving and ceilings that he later developed into a vertically oriented version of what had become known as the "Keppler System."[5] Bruno Taut used Keppler's system in 1914 for his "Glass Pavilion" at the Cologne Werkbund Exhibition. Architects and manufacturers continued throughout the first two decades of the twentieth century to refine Keppler's vertical tile system and develop derivatives, such as Société de Saint Gobain's Nevada glass tile construction.

In 1914 Keppler introduced his glass and concrete construction system to the US building market. Keppler's tiles and similar glass concrete construction systems were offered by Keppler Glass Constructions, Inc., Structural Glass Corporation, and Luxfer Prism Company, among others, and were used throughout the 1920s and 1930s. Despite the measured success of this system for creating glass walls, problems of condensation and structural stability as well as minimal load bearing capacity and negligible insulating qualities continued. What the building industry needed was a "glass masonry unit" that could be erected using the same materials and techniques as common brick and that embodied some of the promise of Falconnier's hollow glass block.

The first hollow glass block hit the market in 1929. In promotional literature prepared for that year's edition of *Sweet's Catalogue File*, the Structural Glass Company[6] of New York offered a series of eight glass blocks, two of which were sealed hollow units. Four of these blocks were Keppler-style tiles; one block, which Structural called "Vacuum Block No. 300," was virtually a direct copy of Falconnier's hand-blown block introduced in the 1880s, and the remaining three were variants on the modern glass block. Structural's "Hollow Block No. 100" was a four-walled hollow block that could easily have been mistaken for a glass cinder block. The company's other two blocks were a solid 10 x 5 x 2.5 inch brick and a six-sided hollow block with the same dimensions.[7] These glass block were available in clear soda-lime glass; "Hollow Block" was also available with wire glass. The Main Building at Sunken Meadows Park in Long Island, New York, incorporates Structural Glass' products, as does architect William Lescaze's house on East 48th Street in New York City, but the success of this company's products was limited.

An article appearing in the September 1932 issue of *The Glass Industry* cited the building industry's lack of interest in glass block and attributed the problem to promotional oversights, specifically the absence of advertising by block manufacturers.[8] The problem may have had less to do with advertising than *The Glass Industry's* editors were willing to admit. Hand-blown glass block offered by early manufacturers were plagued by several inherent defects: wall thickness of the blocks varied, and their shape was inconsistent.[9] Whether poor sales were caused by shoddy products or the lack of advertising made little difference once the building materials division of the glass industry, which had relied heavily on traditional technologies, met the twentieth century.

Brittle or Tough: Glass in the Late 1920s

The glass industry experienced a sea change in the technology of manufacture and material formulation prior to the late 1920s. The building industry benefitted substantially from this evolutionary leap. Virtually overnight, glass was transformed from a brittle, colorless material used almost exclusively for windows to a tough, brightly tinted structural material that could be used for exterior cladding and interior partitions. Changes in formulation and the methods by which glass was treated improved the toughness and durability of products made from glass. Safety glass, sold under tradenames such as Sekurit, and insulating glazing, known then as Thermo-pane, were two of many products that helped paved the way for unprecedented uses of glass in buildings.[10] Structural, integrally colored glass products were another innovation. Introduced in the early 1900s, these products were widely used in the 1920s and 1930s. Typical of these products were Vitrolite and Carrara glass, which were frequently used on the exterior of buildings as low-maintenance cladding and on the interior as a decorative accent and sanitary surface in kitchens and baths.[11]

Glass fiber, which had been widely touted by Edward Libbey at the Columbian Exposition in 1893, also came into its own during this period. Known for nearly a half-century before the

Owens-Illinois Glass Company perfected a means of commercial production, glass fibers were an instant success as a filter material for hot air heating systems and the recently introduced air conditioning systems. In fact, Owens-Illinois' Dustop-brand filters marked the entry of this firm, which had been known as the world's largest producer of bottles (for beverages, medicines, and every conceivable notion) into the market for building materials.[12]

Nearly a half-century of improvements in glass pressing technology were the foundation on which modern hollow glass blocks were built. Formed by joining two "dishes" of pressed glass along the edges of their open sides, the "new" glass block featured walls of consistent thickness, a number of decorative patterns, and insulating performance twice that of standard sash.[13] Further advantages could be found in glass block that were not featured in other new glass products. As an architectural material, glass block was not hampered by an image that relied on the seemingly mysterious scientific benefits accorded fiber glass filters and batt insulation. Unlike structural glass products (Vitrolite and Carrara), glass blocks could be used as a cladding material for an entire building; its translucence permitted it to be used in place of windows and its insulating properties accorded it an advantage over many traditional cladding materials.

Novelty and Pragmatism: The Quick Acceptance of Block

By 1932, when the Owens-Illinois Glass Company introduced its first pressed hollow glass block, glass had lost its image as a fragile and precious material and become a tough and competitive player in the market for new building materials. By 1939, Owens-Illinois claimed there were 50,000 installations of Insulux block in industrial and commercial buildings in forty-eight states and a year later more than twenty million glass block had been manufactured. The success of the glass block was attributed in small part to the novelty of the material, but the sustained interest, as manifested in the sheer number of block produced, could not reasonably be attributed to novelty alone.

Industrial and institutional uses accounted for more than forty percent of production. The use of glass block in a business setting where "novelty could not possibly have determined their selection" was considered a strong recommendation for the product and, as far as the manufacturers were concerned, a more stable market than the homeowners and builders who took advantage of the product's novelty for items such as book-ends, barfronts, and bathtubs. Glass blocks in factories and schools were selected for their functionality and aesthetic qualities. The editors of *The Architectural Forum* put it this way: "They couple one of the functions of the window - its light-giving function - with all of the non-structural functions of the wall - heat and noise insulation, privacy, and security."[14]

Key among the concerns of industrial building designers and occupants was lighting. Articles peppered throughout the architectural and trade press in the 1920s and 1930s focused on methods and materials that would improve the quality of lighting in factories. Safety was often touted as the impetus behind studies to improve lighting conditions, but lighting costs - from capital expenses for lighting equipment to operational budgets for maintenance and power - may also have played a significant role in the building industry's interest in lighting. Large, low manufacturing facilities provided economies in the assembly of goods by placing an entire operation on a single floor, but did so at a cost - greater power consumption for lighting.

With a heat transmission coefficient nearly half that of a standard sash, and equal to that of an eight-inch masonry wall, glass block offered advantages over many traditional building materials. Sash was, perhaps, the most obvious use for glass block, however the frequency with which early block was used on the exterior of buildings had been limited by the relative difficulty of providing a suitable bond with mortar. This shortcoming was addressed when Owens-Illinois introduced an improved glass block that had a sanded adhesive coating applied to the laying surfaces.[15] With this problem neatly resolved, glass block began appearing with greater frequency in industrial buildings as well as being widely used in schools as a complement to traditional sash.

Speed of erection was another factor that made glass block attractive to designers, builders, and developers. Masons could lay fewer glass block per day than they could common brick, but even the smallest block - nominal 6 x 6 inch block typical of production from the late 1930s to the present - were nearly twice as large as brick. Half blocks, designed to be set with their short

axis parallel to the laying plane, eliminated the need for cutting and allowed builders to erect glass block walls quickly and in nearly any brick bond pattern. Production speed was also gained because glass blocks did not need painting or other treatment after they were was erected.[16]

Bottles to Block: The Role of Owens-Illinois Glass Company

The Owens-Illinois Glass Company, formed by the merger of Owens Bottle Company and Illinois Glass Company in 1929, was the largest bottle producer in the United States, if not the world. As the world's economy was collapsing after the stock market crash of October 1929, Owens-Illinois was investing in research and development. Concepts for new glass products emanating from Owens-Illinois' labs kept the company from becoming dependent on a single product line.

The standard glass block of today was a product of Owens-Illinois' investment in research. Introduced in 1932, the first Owens-Illinois glass block was a five-sided deep dish of soda-lime glass that was hermetically sealed on its open side with a flat plate of glass.[17] These blocks were first used by Owens-Illinois in the building they erected at the Century of Progress Exposition in Chicago in 1933. The trade and business press reported the enthusiastic response of fair-goers to Owens-Illinois's "House of Glass" and speculated about the possibilities of glass block making long-imagined buildings of glass a reality. Judging from the coverage in the architectural press of all forms of glass suitable for building purposes, the confluence of a stylistic "revolution" calling for simple, clean lines and honesty about materials and the rapid evolution in glass technology could not have been more appropriately timed.

A gasoline filling station in Columbus, Ohio, built and owned by Ohio Oil Company, was the first commercial application of Owens-Illinois block. The octagonal station incorporated both clear - or plain - block and a block with a baked red enamel coating. Blocks were offered in a number of colors. The edges of the block, which were coated with a layer of cement paint, could be tinted to impart color to light reflected from the inside surface of the sides of the block. A matching color could also be applied on the external plane of the interior face of the block; the exterior face was always left clear.

Owens-Illinois' asymmetrical deep dish block, as one might call the company's first block, was discontinued in the mid-1930s and replaced by a new block form the company called Insulux. Formed of two identically sized, five-sided shallow dishes, the blocks were sealed along their open faces with a metal alloy "weld." Each of the open ends of half of a block was touched to the surface of the molten alloy and then pressed together with great force - effectively welding shut the block. As the block cooled, a slight vacuum formed in the hollow between the halves of the block. The sixty percent vacuum formed as the fixed volume of air cooled in the block's hollow core improved the thermal properties of the product and may have been an inspiration for the name Insulux.

Throughout the 1940s and 1950s, Owens-Illinois continued to improve and add to its Insulux line. The company also maintained research programs in both the laboratory and the field. More than a million blocks were installed in ten of Owens-Illinois' plants in conditions more severe than the company recommended for their customers. Light-diffusing and light-directing blocks were part of Owens-Illinois' Insulux line from the outset and were improved when blocks incorporating a thin fiberglass screen placed between the shallow dishes were added to the light-directing line of Insulux blocks in 1940. Laboratory research on daylighting at the University of Michigan, which was sponsored by the company in an effort to improve the efficacy of their light-directing and light-diffusing blocks, led Owens-Illinois to begin manufacturing a block pressed with a prismatic pattern on the faces of each dish. These patterns were designed to either diffuse or direct light incident on its exterior surface of the block.[18] The company also introduced TopLite blocks for use in skylights. Other blocks were purely decorative: ThinLite blocks, which were only 3-1/8 inches thick, and a block Owens-Illinois called Circon, because the pattern pressed into the faces of the block resembled concentric circles was designed by Walter Dorwin Teague. "Special Standard" block fabricated to an architect's designs could be ordered as well. Ceramic faced and blue tinted glass blocks were Owens-Illinois' attempt to invigorate a languishing product line in the late 1950s. [19] The ceramic block was available in colors ranging from turquoise blue, sea green, sun yellow, and coral in the earliest blocks introduced in the mid-1950s to pastel blue, pastel green, charcoal gray, black, white, deep blue, deep green, deep red, orange, and walnut

in the late 1950s. The color, which was applied as a glaze is to any ceramicware, was fired onto the exterior face of the block and allowed minimal light transmission.

In the 1950s, Owens-Illinois introduced a mortarless system for erecting glass block walls. The "Set-In-Wood" construction system, which could be used for interior partitions only, consisted of a set of long narrow slats of wood that ran horizontally from one end of the partition to the other and short vertical slats that were placed between each block. Other proprietary "demountable" partition systems, as well as reinforcing systems for standard mortared partitions, were also available from independent manufactures such as Revere Copper Products.

By the early 1960s, the enthusiasm for glass block that the building community had initially expressed was waning. With substantial interests outside of the building products industry, Owens-Illinois discontinued production in 1964.

Making the Competition: How Pittsburgh-Corning Came to Be

Incorporated as a fifty-fifty equity venture between Pittsburgh Plate Glass (now PPG Industries) and Corning Glass Works in 1937, Pittsburgh-Corning was organized to take advantage of the research facilities at both parent firms and the product distribution network of PPG. The company's mandate was to manufacture glass block and compete directly with Owens-Illinois.

The history of Pittsburgh-Corning's glass block manufacturing began several years earlier in September 1935, when the Architectural Division of Corning Glass Works[20] formally introduced its Pyrex Glass Construction Unit.[21] This block differed from Owens-Illinois' Insulux block in that the two shallow pressed glass dishes that made up each half of the block were fused together with glass. A year later construction of the Corning Building at the corner of 56th Street and Fifth Avenue in New York City was underway. The editors of *The Glass Industry*, a trade publication, considered this building, which had facades that were more than eighty percent glass block and was built to designs by William and Geoffrey Platt, the "first truly glass office building in New York City."[22] The Corning Glass blocks used at the company's headquarters building in New York City were manufactured from Pyrex glass, a proprietary glass with a lower coefficient of thermal expansion than the competition's soda-lime units. Pittsburgh-Corning also claimed that because they used heat-resistant Pyrex their blocks were less prone to deterioration caused by differential expansion between the glass block and mortar. Corning blocks were used in several other buildings, but the company's interest in glass block wouldn't blossom until after its merger with Pittsburgh Plate Glass.

The first PC Block, the new company's name for Corning's product, rolled off the line at Port Allegheny, Pennsylvania, on February 8, 1938. Where Owens-Illinois followed a numbering system for their blocks, Pittsburgh-Corning named their block. The long-standing Decora and Argus patterns were the first blocks off the line. Between 1938 and 1964 Pittsburgh-Corning and Owens-Illinois followed one another in lockstep, introducing competitive products within months of one another. Among the more novel products that Pittsburgh-Corning introduced were their Skytrol and Suntrol brands for skylights and light control. In the late 1960s, after Owens-Illinois had left the business, Pittsburgh-Corning introduced two lines of block with deep relief geometric designs on each face; the company called one line Chiaro and the other Sculptured Glass Modules. Intaglio Glass Wall Units, a third line, were all-glass blocks featuring a recessed "antique" glass area - in lozenge, circle, and hour-glass shapes - surrounded by a textured baked-on frit.

By the late 1970s business had slacked considerably, no doubt because glass block had become associated heavily with industrial buildings and due to Pittsburgh-Corning's dubious decision to manufacture sculpted block. Pittsburgh-Corning, the last domestic manufacturer of glass block, announced it would discontinue production. A letter-writing campaign spearheaded by John Morris Dixon, editor of *Progressive Architecture*, and Charles Gwathmey, among others, convinced Pittsburgh-Corning to reconsider their position. Pittsburgh-Corning glass block were back in their traditional forms by the early 1980s.

Mending Wounds: The Pitfalls of Salvage

The ease with which broken block could be replaced was a major selling point for the material. Owens-Illinois literature claimed that "glass blocks are as easily removed and replaced as a pane of sash glass." Blocks shattered by impact could be removed by simply drilling out the mortar at each corner and cutting around the block with a keyhole saw or breaking out the

broken block with a hammer. New block of the same pattern, buttered on four sides, could be slipped into hole and the job finished by pointing with mortar to match the original. Where damage extended beyond a single block, areas three blocks high or two blocks wide could be removed and replaced one at a time.[23] The model building codes do not appear to prohibit this type of repair, but today the scarcity of new blocks that match the pattern of the existing units may mean that this repair option is not feasible.

Blocks salvaged from other structures or portions of the same structure that are not part of the main facade in some cases may be used to replace broken block. The BOCA National Building Code (1993) has no specific prohibition against using salvaged block, although the specifications for cleaning and inspecting blocks are so stringent as to be nearly prohibitive: "2105.6 Second-hand units: Second-hand masonry units shall not be reused unless the units conform to the requirements for new units. The units shall be whole, sound material and be free from cracks and other defects that will interfere with proper laying or use. All old mortar shall be cleaned from the units before reuse."

Engineers consulting on the project as well as others whose recommendations may ultimately force them to accept responsibility for the disposition of the structure built of salvaged material may be reluctant to condone salvage. This professional aversion to salvage, which should not be considered a loosely disguised dislike for preservation, may be particularly strong when the project involves extensive reconstruction. Discussions the author has had with several engineers indicate that their concerns about the structural stability of salvaged material are not as severe when the proposed work affects only the few broken blocks in a largely intact structure.

Subtle differences between light directing and light diffusing block could thwart efforts to salvage material. Light-directing block, according to both Owens-Illinois and Pittsburgh-Corning literature, was suitable for installation above eye level only. These blocks were designed to direct light upward to ceilings coated with or made of reflective materials. Using light-directing block below eye level may cause unsafe or distracting glare.

Small repair jobs using salvaged block may be the only work that is economically feasible. On large jobs where the requisite amount of block is available, but has not been cleaned and inspected to meet code, the labor costs for cleaning the block in compliance with the code may be prohibitively high.[24] In these cases, new custom-manufactured block may be the best option. Pittsburgh-Corning, the last domestic manufacturer of glass block, will fabricate custom block to match historic patterns provided that the block size is a nominal eight-inch square, the production run is no fewer than 5,000 blocks, and a ten thousand dollar set-up and machining fee is paid up front. Problems with this approach include difficulty matching the glass color in the original blocks, particularly tinted or colored block that were introduced in the 1950s, and Pittsburgh-Corning's inability to produce block in the historic six- and twelve-inch nominal sizes and or to match the earliest brick-shaped block.[25]

Ways of Making Sealing Wax

Mineral deposits that cause clouding, or a bloom, on the interior surface of a glass block are a common deterioration phenomena and almost always an indication that either the walls of the block are cracked through or the seal between the blocks has failed. Beginning in the mid-1930s when Owens-Illinois introduced their Insulux-brand glass block, the company used a metal alloy to seal the halves of their block.[26] Conversely, Pittsburgh-Corning had from the outset sealed their block by directly fusing the shallow dishes together. This "all-glass" seal was, time has proven, far more durable than Owens-Illinois' metal seal.[27] Where the whitish bloom, caused by minerals borne by water entering the block, is distracting or the cracked unit is structurally unstable, new or salvaged replacement blocks can be substituted. Where new blocks are placed in walls adjacent to Owens-Illinois' alloy sealed block, the problem of water leaking into the block may continue as the original blocks age.

Salvage and replacement may be an anathema to local preservation officials and granting agencies, but, at present, there are few other options available. While there is no known method for conserving existing block, the glass conservation literature, which has not been consulted by this author, may yield processes for removing accumulated mineral deposits from the interior of block, methods for repairing the metal seals on early block, and details on mending cracked glass.[28]

A Century of Structural Glass

The 1980s witnessed a rebirth in the use of structural glass, particularly glass block in commercial office and residential construction. After nearly a century in development and a brush with death, it seems at least one element of the glass revolution of the early twentieth century has found a lasting place.

Notes

[1] The subject of prismatic glass is capably treated by Dietrich Neumann in his paper "Prismatic Glass," *Building Renovation* (March-April 1993): 57-60.

[2] "Blown Glass Bricks for Building Purposes," *Scientific American* (2 January 1897): 10. European glass block manufacture in the 1920 is also noted in: Burchard, John Ely, "Glass in Modern Housing," *The Glass Industry* (December 1937): 379. I am grateful to Dietrich Neumann and Thomas C. Jester, editor of the forthcoming book *Twentieth Century Building Materials*, for permission to review Professor Neumann's chapter on glass block. Details of early European forays into glass block manufacture, most of which were unsuccessful, and licensing arrangements with the successful firms can be found in Professor Neumann's text.

[3] Buildings that incorporated Falconnier's block include: Auguste Perret's apartment block on Rue Franklin (1902), Hector Guimard's Castel Béranger (1899) and Le Corbusier's Villa Schwob in La Chaus de Fonts (1914). For this list of buildings, thanks are due Dietrich Neumann, Assistant Professor, Department of History of Art and Architecture, Brown University.

[4] The hand-blown bricks in the "glass-brick pavilion" were manufactured by Glashüttenwerke Adlerhütten Actiengesellschaft (Penzing, Silesia, Germany) and apparently were available in a number of shapes and sizes. "Glass Paving and Building Bricks," *Scientific American Supplement* VLIX, no. 1538 (24 June 1905): 24643.

[5] Keppler was granted a US Patent in 1911 for the vertical glass block partition system. Again, thanks are due to Dietrich Neumann for providing patent dates and for the following list of buildings that employed "Keppler's System" or similar systems developed by Luxfer's competitors: Luckhardt Brothers housing estate in Berlin (1926); Bruno Taut's residence (1926).

[6] Dietrich Neumann indicates in his paper that Keppler Glass Constructions, Inc. became the Structural Glass Company. In the 1920s both firms were located at the same New York City address, but the author has not been able to independently confirm, or refute, the assertion that Keppler's firm assumed the name "Structural Glass Company." Keppler's firm, according to his obituary in *The New York Times*, was dissolved in 1930. "F.L. Keppler, Leader in Structural Class [sic]," *The New York Times* (1 August 1940): 21:4.

[7] "Structural Glass Corporation," *Sweet's Catalogue File* (1929): B1774-1775.

[8] Structural Glass may have been the sole US producer of glass blocks in 1932. A small note at the bottom of the first page of the Corning Glass Works' catalogue in the 1932 edition of *Sweet's Catalogue File* indicates that the company had available for sale a hollow glass block. No image accompanied the text and little else is known about this product. The text is included here for those wishing to pursue the matter further: "New Pyrex Resistant Glass Construction Block ¶ A new construction material of great ornamental possibilities. Hollow glass blocks 8-3/8 x 4-1/4 x 3-3/4 inches with decorative pattern on each face. High light transmission for artistic lighting effects. These bricks are made of PYREX heat-resistant glass."

[9] The glass block manufactured by Structural Glass may or may not have been hand-blown. Archival records surveyed for this paper do not indicate how these blocks were made.

[10] Thermo-pane glass is noted as a new product in: "New Type Double-Glazed Window," *Scientific American* 151, no. 4 (October 1934): 218-219. Thermo-pane glazing was described by the trade press as "two pieces of glass separated by dehumidified air and bound together at the edges by synthetic resin." John Ely Burchard, "Glass in Modern Housing," *The Glass Industry* (December 1937): 379. Safety glass is described as "new" in: "Unbreakable Glass," *Scientific American* 147, no. 4 (October 1932): 292-293.

[11] For more on structural glass, see: Carol Dyson and Floyd Mansberger, in *Preserving the Recent Past* (Washington, DC: Historic Preservation Education Foundation, 1995).

[12] Owens-Illinois also manufactured Red Top Insulating Wool, which it sold through United States Gypsum. The nature of the relationship between these two companies was not discovered during the course of researching this paper.

[13] Earlier blocks from Owens-Illinois had a slightly different construction. See the section: "From Bottles to Block."

[14] Production figures through 1940 from: "Products and Practice: Glass Block," *The Architectural Forum* (May 1940): 327. In addition to this general information about Insulux installations in 1939, Owens-Illinois indicated that an auto manufacturer had specified their block for six different plants, a utility company used 40,000 blocks in seven power houses, and a textile company used 317,000 blocks in a single plant. "A Report to Architects: Insulux in Industry," *Architectural Record* (June 1939): 127 (advertisement).

[15] The Owens-Illinois Building in Toledo, Ohio, also known as the Owens-Illinois Office and Research Facility, incorporated the new glass block. "Windowless Offices for Industry," *Engineering News-Record* (March 26, 1936): 459-460. The sand and adhesive coating on Insulux blocks is also noted in "Owens-Illinois Glass Block," *Sweet's Catalogue File* (1939): 3.

[16] On the speed of erection, see: "Insulux Light-Conditioning Helps Architects Solve Many

Problems of Modern High School Design," *Architectural Record* (August 1939): 120. This advertisement asserts that "The sand-coated flat mortar-bearing surface of Insulux makes them easier and more economical to install." Other Owens-Illinois advertisements more directly address the rate of construction. One ad claimed that "The ease and speed with which Insulux can be erected played an important part in establishing the record time of 63 days for the erection of" the 1,250,000 square foot plant owned by the Cudahy Packing Company, Albany, Georgia. "Air-Conditioned Daylight Plant Built in 63 Days," *The Architectural Record* (February 1937): 20. On bonding patterns, see: "Translucent Masonry of Owens-Illinois Insulux Glass Building Blocks," *Pencil Points* (September 1935):1-32 (special insert).

[17] The author has not been able to locate precise dimensions for Owens-Illinois' first glass block. However, the No. 1 Series of Insulux blocks, which were offered for several years in the late 1930s, were similarly proportioned and measured 4-7/8 x 8 x 3-7/8 inches (height x length x depth). The rectangular block was later discontinued. Glass block sizes were standardized in the late 1930s: All blocks were 3-7/8 inches deep and nominal 6, 8, and 12 inch squares.

[18] Photographs of these blocks indicate the differences between light diffusing and light directing blocks were subtle.

[19] Owens-Illinois offered "Special Standard" blocks that could accommodate architect's desire for colored blocks, blocks with custom cuttings, or blocks of an odd size. "Translucent Masonry of Owens-Illinois Insulux Glass Building Blocks," *Pencil Points* (September 1935):1-32 (special insert).

[20] Corning-Steuben was the Architectural Division of Corning Glass Works.

[21] "Announcing the New Pyrex Glass Construction Unit," *The Architectural Record* (September 1935): 15 (advertisement), and *Glass Construction Unit Manufactured by Corning-Steuben Architectural Division of Corning Glass Works*, uncatalogued typescript at New York Public Library, 1935.

[22] "New York's First Glass Office Building," *The Glass Industry* (October 1936): 336.

[23] "Translucent Masonry of Owens-Illinois Insulux Glass Building Blocks," *Pencil Points* (September 1935): 1-32 (special insert).

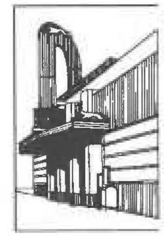
[24] More research is needed to confirm this statement. The author has not found any data indicating that cleaning salvaged block is or is not economically feasible. This statement was based on the author's own experience with other salvaged non-glass masonry as well as several discussions with contractors and engineering consultants.

[25] Wiss, Janney, Elstner Associates chose this option when confronted with replacing more than 10,000 blocks at the Hecht Company Warehouse in Washington, DC.

[26] An article in the *Engineering News-Record* in 1936 describes Owens-Illinois' method of manufacture: "The blocks are manufactured as two glass dishes of uniform wall thickness whose edges are dipped in molten metal and then pressed together while hot to form a hollow unit." "Windowless Offices for Industry," *Engineering News-Record* (March 26, 1936): 459-460. When, or if, Owens-Illinois's practice of sealing their block with a metal alloy was discontinued has not been ascertained. In their literature in the 1939 edition of *Sweet's Catalogue File*, Owens-Illinois describes their block as having a "Patented Metal Weld". This is the last mention of this metal seal that the author has found. However, in the absence of evidence indicating that Owens-Illinois began fuse-sealing their block it is difficult to assert that all blocks produced after 1939 are "all glass."

[27] In the renovation of the Hecht Company Warehouse in Washington, DC, Wiss, Janney, Elstner and Associates found that in blocks exhibiting characteristics of water infiltration - clouding of the interior surface and freeze-thaw induced explosion - the metal seal on the early Owens-Illinois glass blocks had failed.

[28] Silicone sealants and isocyanurate glues have been suggested as materials that might be suitable for resealing blocks and repairing cracked glass, respectively.



Replacing Historic Asphalt Shingles

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After their marriage in 1919, Harry and Bess Truman lived together in her mother's Independence, Missouri, home. Constructed in 1867 and greatly enlarged in 1885, the frame house bore the characteristic elements and charm of the Victorian period, including a wrap-around porch, delicate millwork, and asymmetrical massing. Decorative, polychrome slate shingles had protected the mansard roofs for almost seventy years by the time the Trumans purchased the home from her mother's estate in 1952 (Figure 1).[1] That shingle system served the house well until ice and hail storms severely damaged the roof and interior plaster finishes late in the following decade. The Trumans considered replacing the slate shingles in-kind, but the former president's failing health led Bess to select asphalt strip shingles because they could be installed more quickly than slate shingles. Together, the Trumans selected an asphalt shingle style and color they believed matched the old faded slate.[2] The new roof was installed in 1969. Only three years later the former President of the United States passed away in a local hospital.

The Truman home and the bulk of its contents passed into the protection of the National Park Service upon Bess Truman's death in late 1982. Work was initiated to replace failed gutters and downspouts, rewire the house, stabilize and repair deteriorated structural and cosmetic elements, and paint the exterior of the house. After four years of repair work, efforts turned toward replacement of the roof system selected by the Trumans. Measurable portions of the shingles' protective granules had eroded, and the base sheets had become brittle in the Missouri climate.

The park's General Management Plan directs that the period of significance for the property is from the beginning of Mr. Truman's White House career in 1945, until his death in 1972. Because few changes were made to the house during the ten years following his death, a preservation attitude was established to conserve existing fabric and building systems. This attitude extended to the treatment of the roofing system. Although Mr. Truman lived only three years during which the asphalt shingles remained on the house, the decision he and Bess made with regard to selection of asphalt shingles had a direct influence on the appearance of the house. In a way, selection of the asphalt shingles personified Mr. Truman's frugal character. Installation of the shingles was an event initiated by the Trumans, and the Trumans are the reason that the house is a National Historic Landmark. It was felt that the careful preservation work initiated on the house since 1982 should also carry over into replacement of the asphalt shingle roof.

Research indicated that the Trumans selected shingles with the following specifications:

Product Name: GAF Fireguard Asphalt Shingles

Type:	Mineral
Weight:	325 pounds
Exposure:	5 inches
Configuration:	2-tab
Color:	Royal Gray blend
Granule Size:	#9

Product research in late 1985 showed that the asphalt shingle style and color selected by the Trumans was still available through GAF under

Figure 1. The Truman home circa 1945. Note the decorative slate shingles at the primary and porch roofs. (Photograph courtesy of Truman Library)

the trade name "Royal Sovereign Self-Sealing" shingles. However, there were minor differences between the old and proposed shingles. The old shingles had an organic, or rag, base impregnated with asphalt, whereas the new shingles featured a fiberglass mat. Fiberglass mats allowed the manufacturer to use less asphalt, yet in theory attain a shingle strength similar to that of the older organic shingle.[3] Because the fiberglass mat shingle is half the 3/16-inch thickness of the old shingles, it casts a narrower edge shadow. But it was felt that this was of minor significance. Another difference was that the granule size was larger on the old shingles versus the proposed replacement shingles. However, this difference can only be detected when the shingles are viewed at very close range.

The tab configuration on the Truman shingles was out of the ordinary, but two-tab shingles were still obtainable. Mass produced asphalt shingles are predominately available in strips measuring twelve by thirty-six inches. The bulk of these strip type shingles are divided into three equal sections, commonly known as tabs, each measuring twelve inches in width. The Truman shingles feature two tabs, each tab eighteen inches in width.

Construction documents specifying the GAF shingle were completed, and a construction contract was successfully procured though a local roofing contractor who, ironically, had installed the old roof in 1969. Soon after the contractor began to research the availability of the specified shingles, he discovered that GAF had discontinued the two-tab shingle style during the four month period between specification of the shingles and contract bid solicitation. Only the three-tab shingles of the required color were available. After an unsuccessful attempt to find a supply of the two-tab shingles at Independence building supply yards, the roofing contract was terminated, and alternative treatment research was begun.

Several alternatives to reroofing the Truman house were explored. The first alternative was to custom order two-tab shingles. Research of several shingle manufacturers, including GAF, indicated that custom ordering a small quantity of mass-produced building materials was an expensive proposition. The two significant characteristics of the shingle, color and configuration, had to be satisfied. Color was the primary limiting factor in locating a manufacturer to custom produce two-tab shingles. Most shingle manufacturers maintain a proprietary list of colors specifically formulated to their specifications. Granules are produced by only three companies in the United States. One shingle producer only dealt with brown tones popular within a particular area of the country. Only GAF Corporation produces the Royal Grey blend color required for this project.

Another limiting factor was the ability and willingness of the shingle manufacturer to produce the desired shingle configuration in limited quantities. In the mass-production process, the base material is continuously saturated with asphalt, cooled, then coated on each surface with asphalt (Figure 2). Granules are applied to each surface while the asphalt mat is tack. The top surface receives the colored

granules intended to be exposed to weather and view. After a period of cooling, the sheet is cut into individual strip shingles. Finally, rotating blades cut slots into the shingles to produce the tabs.[4] Once this process begins, it is only stopped when the desired quantity of shingles are completed, raw materials are depleted, or the machine malfunctions. After questioning several manufacturers it was found that the minimum custom order was 700 squares (70,000 square feet) of shingles. The Truman home only required 35 squares, making this alternative very expensive. A further factor was the availability of blades, or cutting cylinders, to cut the shingles and slots (Figure 3). Two companies that had run two-tab shingles in the past were either uncooperative as to the availability of the two-tab cutting cylinders, or claimed to have no knowledge of whether the old cutting blades had been salvaged.[5]

A second treatment alternative was to locate an overstock supply of two-tab shingles. This was initially attempted locally, but broadened to include surrounding states. One issue immediately surfaced. There was only a remote chance of locating 35 squares of discontinued shingles at one source. Therefore, two or more suppliers would have to be found to achieve the desired quantity. However, there was no guarantee that separate runs of the same shingle style would be of the same color, due to batch differences in the granules.

A third alternative was to install the GAF three-tab shingles in the hope that the two-tab line

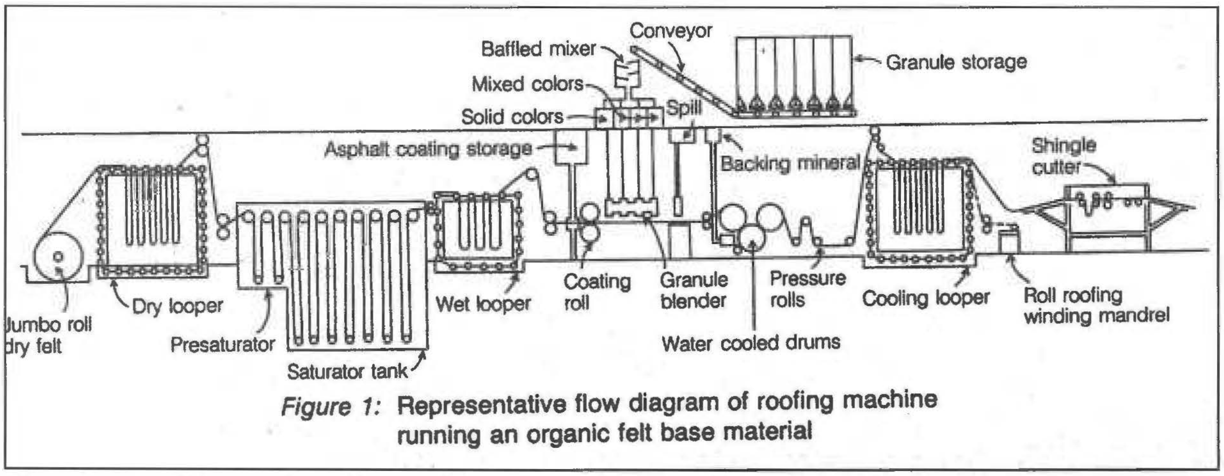

Figure 2. Flow diagram of a roofing machine. (Reproduced courtesy of Asphalt Roofing Manufacturers Association)

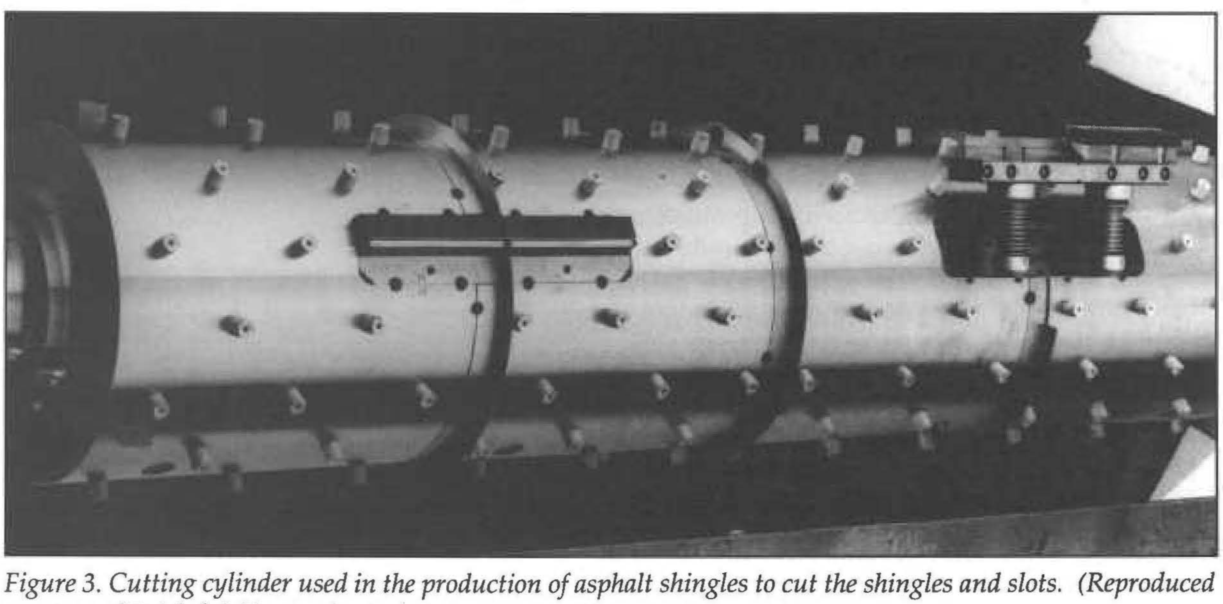

Figure 3. Cutting cylinder used in the production of asphalt shingles to cut the shingles and slots. (Reproduced courtesy of Reichel & Drews, Inc.)

would be revived at a later date. The question was posed whether a three-tab shingle would make any difference in appearance of the Truman home. In response, front elevation drawings of the house were prepared for comparison of the two and three-tab configurations. When evaluated objectively, the character and scale between the two roofing systems was comparatively slight. But the narrower shingles had a somewhat more significant change at the mansard roof over the front porch. The small porch roof is closer to the ground and more affected by the scale of the shingles than the house roof. However, visitors to the site would probably never notice the difference.

Alternative four was to install slate shingles as had existed on the house prior to 1969. This was achievable, but some aspects of the roof were unknown. There are several good historical photographs of the two front elevations, but there are no good photos of the back of the house. Good photos would be required to scale and lay out a shingle design. Another limiting factor was that few shingles remain from the old roof. A few shingles were found in the attic and carriage house loft, but not enough to render an accurate color range. Installing slate shingles would alter the period of significance for the property identified in the General Management Plan and would reverse a preservation standard established for the house.

The fifth alternative was to modify single-tab shingles or roll roofing into two-tab shingles. The concept behind this alternative was to purchase the single-tab shingles and modify them into a two-tab shingle. This could be done by halving the single-tab shingle, or punching out a middle slot to create the two-tab appearance (Figure 4). The disadvantage in this alternative is that there would be much labor expended in modifying 35 squares of shingles, and shingle manufacturers generally do not provide warranties for their modified products. It was also unknown how contractors would respond to the time-consuming process of modifying the shingles. At that time GAF offered a single-tab shingle, under the trade name "Nor'easter," to a retail market along the wind-blown New England coastline. Unfortunately, GAF was not producing Nor'easter shingles in the Royal Grey blend color. Roll roofing was considered, but rejected as the material is very thin. Much more labor would also be required to cut the roll roofing into strip shingles.

Each of these five alternatives were considered and evaluated by National Park Service cultural resource professionals and managers. The consensus was that asphalt shingles should remain on the house as a testament to the Trumans' influence on the structure. Every effort would be made to implement the installation of two-tab shingles. If this alternative was not feasible, the readily available GAF three-tab shingle would be used in the hope that the two-tab shingles would be revived in the future.

With assistance from the Asphalt Roofing Manufacturers Association, further research was conducted to locate a shingle manufacturer willing to provide shingles with the required specifications. After numerous contacts and pleas for assistance in trade magazines, it was abundantly clear that no shingle manufacturer was willing to provide a small order of two-tab shingles.

In 1988, when it became clear that the shingles would probably have to be manually slotted, the

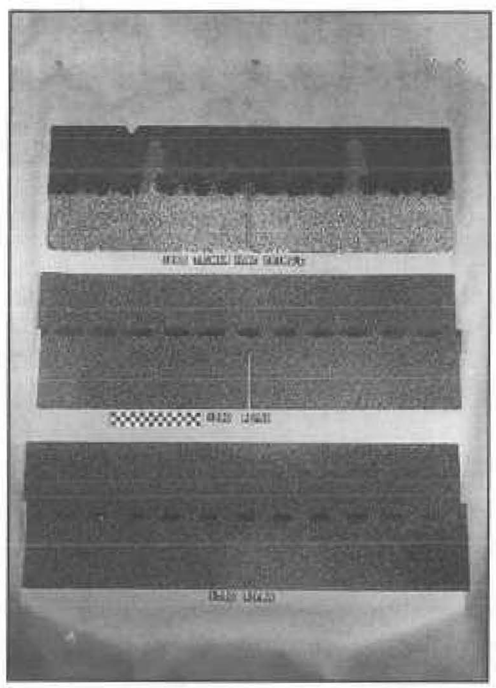

Figure 4. At the top of this photograph is a two-tab shingle removed from the Truman Home during construction work. Slots in the new middle shingle were cut from the single-tab shingle at the bottom, using a hand operated jig. (Photograph courtesy Harry S Truman National Historic Site)

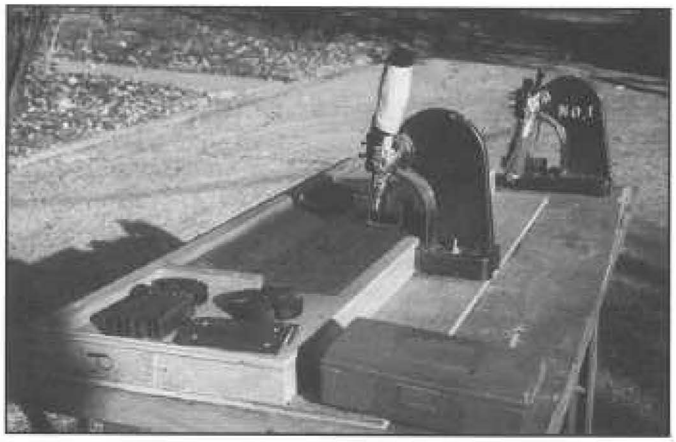

Figure 5. The jig with a blank shingle ready for slotting. The lever was drawn down by hand to produce the slot. (Photograph courtesy Harry S Truman National Historic Site)

project was passed on to the Williamsport Preservation Training Center (WPTC) for implementation. WPTC directs many of the challenging restoration and preservation construction projects in the National Park Service system. And this project was no exception. Intermittently, over a two year period, project managers at WPTC contacted several shingle manufacturers, including GAF, in unsuccessful attempts to persuade them to produce a custom run of two-tab shingles. One East Coast manufacturer was willing to provide two-tab shingles, but samples provided by the company were not even close to the required color. That manufacturer stated that costs would be extremely high to make a run of custom colored shingles.

One last attempt was made by WPTC to contact GAF to coax them into providing single- or two-tab shingles for the project. Previously contacts with GAF had been made with salesmen and public relations administrators who were sympathetic but uncooperative in solving our problem. On this occasion a technical manager was contacted; he pledged that GAF would produce Royal Gray blend single-tab shingles by pulling the slot cutting blades from the cylinder, or custom run a 100 square batch of two-tab shingles. While the availability of two-tab shingles was certainly appealing, one hundred squares was nearly three times the quantity needed for the project. The added cost of obtaining and shipping an extra 65 squares, and the difficulty of storing them in a controlled environment to prevent deterioration were factors also considered. Asphalt shingles have a shelf life and cannot be kept for extended periods without the asphalt staining the granules.[6] A decision was quickly made to purchase 40 squares of the single-tab shingles before GAF had a chance to renege on their commitment. An extra six squares was acquired to account for roofing waste, possible errors in cutting the slots, and as patch material. In November 1989, the single-tab shingles were delivered from the East Coast to the Truman home at a cost of one thousand dollars.

Once the challenge of finding the correct raw material was resolved, WPTC turned efforts toward designing a jig to cut the shingle slots out of the single-tab shingles. Using a cutting blade supplied by GAF, WPTC constructed a manual punch that operated in a similar fashion to a paper shear. The device was constructed and successfully tested at the WPTC workshop early in 1990. Slots were cut by inserting individual shingles into a jig and applying pressure to the lever with both hands (Figure 5).[7] With this method, approximately one and one-third squares of shingles were slotted per man hour.[8]

Since the shingles were on-site, and WPTC was familiar with operation of the punch and project history, it was felt that project could be better controlled and served by hiring WPTC to install the shingles. A WPTC four-man crew assembled at Truman home in October 1990 to punch slots and install the roofing. Once a process and assembly line were established, the work proceeded without incident. Installing the new shingles was anticlimactic; the work was like any other asphalt roofing job (Figure 6). The old shingles were stripped from the roof, deteriorated sheathing and flashing was re-

Figure 6. Tearing off the old shingles from the Truman home. Note that the shingles were in the early stages of cupping. (Photograph courtesy Harry S Truman National Historic Site)

placed, and the new shingles installed in two weeks time. Representative samples of the old shingles and underlayment were accessioned into park curatorial collections. The extra shingles and the punch remain at the park, awaiting the next roofing challenge. While materials costs for this project were comparable with typical market prices for strip shingles, manual modification of the shingles added a premium to the cost. If punch fabrication and shingle modification labor costs are factored into the price, the shingles cost about $95 per square. This compares with about $50 per square for shingles at retail sale in 1990. The former figure does not include the hundreds of man hours expended researching alternatives in obtaining the required shingles for the project.

Subjectively, the character of the new roofing is very close to that of the old roofing, although the new shingles appear brighter in comparison to the weathered shingles dating to 1969. From beginning to completion, the duration of the entire project extended over five years. Several lessons were learned along the way to successfully completing the project:

- There may be difficulties in obtaining replacement, mass-produced building materials for historic preservation projects, especially for those materials that have been discontinued. Manufacturers rapidly respond to market demand as a function of raw materials availability and style trends.
- Extensive research may be required in locating substitute materials that will preserve the historic integrity of the structure.
- A discontinued, mass-produced building material may require ingenuity, substantial manual labor, and additional cost to custom fabricate.
- Compromises may have to be made in appearance and performance characteristics of the replacement material.
- When contacting potential sources for replacement materials, request assistance from a technical representative who understands the manufacturing process. Salesmen typically sell current product lines and do not make money accommodating special requests.

Notes

[1] Ron Cockrell, *Historic Structures Report: History and Significance, Harry S Truman National Historic Site, Independence, Missouri,* (Omaha, Nebraska: National Park Service, 1984), 179.

[2] Ibid., 265.

[3] "Fiberglass Shingles Not for North," *New England Builder* 6 (no. 7, April 1988), Letters. Reduction of asphalt quantity in shingles was an outgrowth of the 1970s oil crisis, according to the author.

[4] *Residential Asphalt Roofing Manual* (Rockville, Maryland: Asphalt Roofing Manufacturers Association, 1980), 6-7.

[5] Cutting cylinders are extremely expensive and not the type of equipment casually discarded.

[6] *Residential Asphalt Roofing Manual,* 7. Over time the weight of the stacked shingles compresses the granules into the surface coating.

[7] Using a hammer to punch the shingles was considered, but it was felt that occupying both hands during the process would provide a measure of safety for the worker since the blade was unshielded.

[8] Figure from Bill Hose, WPTC. Productivity decreased substantially after two to three hours of work. The workers developed tennis elbow after several hours of labor to slot the shingles.

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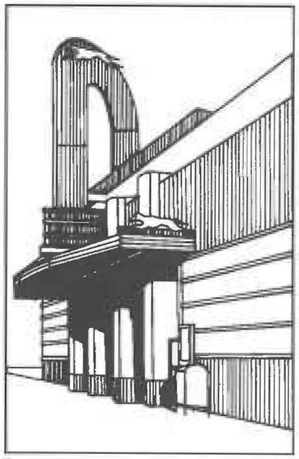
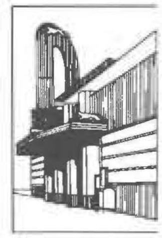


Building Systems and Modern Hazards



Conflicts Between Preservation Standards and Environmental Hazards

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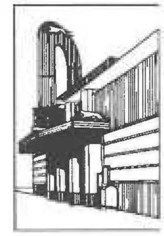
Abstract
Hazardous materials can be found in all types of building construction, including the structures of the recent past. Preservation professionals often discover or encounter environmental hazards or contaminants during the repair or restoration of existing buildings or structures. When hazardous materials are encountered, careful investigation and analysis are necessary to determine the extent and severity of the hazard and to develop special precautions that may be needed to mitigate potential exposure to the hazardous materials.

Architects, engineers and other building professionals have a responsibility to provide for the health, safety, and welfare of building occupants. This charge should include limitation of human exposure to toxins in buildings. The most important responsibility is to limit potential exposure to occupants and users during normal building use, since occupants and users are generally not cognizant of potential environmental hazards. Another primary responsibility is to limit exposure to workers performing construction work in a building. A secondary, but significant, responsibility is to limit exposure to the exterior environment, which can result in exposure to the general public. When considering the risks of environmental hazards, an assessment of the risk of disastrous occurrences, such as fires, floods or earthquakes, should also be a component of the evaluation of the potential environmental hazards.

Typically encountered hazardous materials, such as asbestos, lead, and PCBs, have been used in many new ways in modern buildings. Asbestos can be found in spandrel panels of aluminum and glass curtain walls, for example. Another example is the use of PCBs in joint sealants. Additionally, a host of new, potentially hazardous materials, such as other organic chemicals, were used in building products and materials in modern buildings. Halon, effectively used as a fire suppressant, is now banned due to its detrimental effect on atmospheric ozone. Plywood has previously been made with glues containing formaldehyde, which can present a health hazard to humans. Many other potentially hazardous materials have been used in "modern past" buildings whose potential detrimental health or environmental effects are not yet fully known.

Placing human and environmental health as a primary responsibility may not coincide with current preservation philosophy. The most effective mitigation method for hazardous materials is to remove the material from the building, thereby avoiding future exposure. However, this method is diametrically opposed to preservation standards, which state that removal of historic materials is to be avoided. Development of standards for "preserving" these types of materials will be a significant issue as the more recent buildings gain historic significance. Is it possible to develop methods that will preserve these materials as well as provide for human safety and environmental responsibility? Should these materials be preserved at all where they are used in places where detrimental effects can occur? Maybe it was a mistake to use these materials, and past mistakes should not be compounded by trying to preserve them.



A History of the Flat Roof and Its Implications for Drainage

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Abstract
Horizontality, especially the flat roof, is the emblem of the Modern Movement. Flat roofs leak. Many are struck by the fact that the discourse in the architecture literature which defends the use of the flat roof fails to mention this uncomfortable condition of its performance and its impact on the building beneath. Instead, the flat roof carries an ideological burden through the modern Movement. The architectural discourse of the 1920s was very highly charged, provoking a critique of the nationalism and even racism of the era of its adoption.

This paper investigates the history of flat roof construction, from ancient indigenous construction through the medieval, Renaissance. and rationalist periods. The literature of architecture dates from the Renaissance, when the symbolic and political content of architecture was of greater concern to readers than the technical performance. In a discussion of the Modern Movement, especially of the Stuttgart *Weissenhofseidlung*, the cultural currents that forced flat roof construction are viewed on their own terms and through the eyes of those who were suspicious of their performance.

Preservationists often ask, why would one adopt an element of design and construction that seems so unsuited to its climate and region. This paper attempts to answer that question. In so doing, it takes note of an irony in preserving artifacts of the recent past - some of those artifacts, including flat roof structures, arose in opposition to preservation movements.

Introduction
The intended audience for this paper is the community of preservationists, including preservation architects. Those in the craft of preservation and the preservation of craft often encounter flat roofs with a lament, recognizing the ticking time bomb overhead that threatens the durability of the historic fabric beneath. Those in the architecture of preservation encounter flat roofs with the recognition that those flat roofs, more than any other architectural element, have been icons in the crossfire of political, social and even racial upheavals of the twentieth century.

The aim of this paper is not to criticize flat roofs; they can be constructed for longevity if constructed well. It is not to discourage or encourage their use; preservationists must contend with the historic fabric they are given. It is not to explain how to restore proper drainage; good texts are available for roofing, and further work must be done to enhance site drainage.

Rather, the aim of this paper is to ensure that the crafts do not ignore the ideological ballast that flat roofs carry, which weighs heavier than river rock. Flat roofs leak. One side sees flat roofs as emblems of milleniarist movements, and for whom the leaks are inconsequential oversights of subordinate trades. The other side screams to fix the leak. How can these two sides speak to one another? How have they spoken to one another in the past, or how have they ignored one another? This paper will trace the significance of the flat roof up through the Modern Movement. Its focus will be on the iconography of roof systems in Europe, not in the United States. With such a presentation, a bridge may begin to be built that may permit those who remain bothered by the leaks to understand, for better or worse, the polemical significance attached to this roof. With that history in mind a

perspective can be gained that will permit those concerned about the cultural significance and those concerned about the natural significance to arrive at a common understanding.

What is most curious in the literature of architecture, up to the Modern Movement is the *absence* of discussion of the performance of the elements of style. Unspoken assumptions are nothing new in architecture. The writings of the Beaux-Arts rarely mentioned symmetry.[1] The writings of deconstruction rarely mention the slashing line or the airfoil roof. The Modern Movement spoke of industrial aesthetics and new societies, but its manifestos of the time tend to ignore what the public knew about flat roofs, rainwater drainage, and the ramifications of these design choices. Most contemporary readers of the architecture literature might be persuaded of the importance of style and conclude that drainage is of little significance. Indeed, that argument carries weight in view of the topics addressed by the visionaries of the period such as utopia, the soul of man, the *zeitgeist*, the spirit of the age. Walter Gropius claimed that it is the aim of an architect to go "beyond competence" though such a comment leaves many of us wondering what could become of competence given this desperate pursuit beyond.

But we are preservation architects, and we have no illusions on this issue. Rainwater drainage is essential to the performance, durability, comfort, energy efficiency and operation of any building.

So, why is there this disparity between our perception of the importance to be attributed to rainwater drainage and the dismissal of drainage in architecture's literature? Perhaps the greatest lesson of the Modern Movement is that preservationists now attempt to preserve buildings that seem hell-bent on self-destruction and that arose in an ideology opposed to the principles and practice of historic preservation. Vernacular building traditions have usually archived the best drainage techniques. The position adopted by modernist polemicists is in opposition against the vernacular and traditional - throwing the bath water out with the baby. One may ask, why bother with preservation, when the spirit embodied in the design is a partisan shot against the common sense of what ensures building durability?

The answer is simple, of course. In the opposition between modernism and preservation, preservation wins. Preserving monuments that formerly stood in opposition to preservation is not unlike a Marshall plan for the built landscape to come.

Pre-modern flat roof construction
Ancient practice

Whatever one can say about the performance of a flat roof, at least its geometry is simple. The earliest known roofs in the Middle East and around the Mediterranean were flat. Early roofs from Afghanistan, Turkey (including those of Chatal Huyuk), Jordan, North Africa, Crete (including the palace of Cresus, who, we suspect, could have afforded the best), Italy, Greece, etc., were flat, with timber framing supporting a surface usually of clay mud.[2] The water absorbed by the clay would cause it to swell, improving its impermeability and cooling the roof as well as the water evaporated. Early flat roofs had flagstones to help water drainage along paths of greatest concentration. There are suggestions of the use of bitumen and metal for water shedding in Roman construction. Clay tile roofs (common in temple construction and in atrium houses) were simple upgrades from flat mud roofs, and these roofs were inclined to 15º-20º to enhance water shedding.

Steep roof structures were typical of indigenous construction in cold weather regions, not only to shed rain and snow but to exhaust the smoke of indoor fires. It appears that all indigenous roofs outside of warm regions with low rainfall had, from the outset, steep roof systems.

Vitruvius wrote about water, though mostly in terms of how to conduct it *toward* buildings rather than away from them:

> Furthermore philosophy treats of physics where a more careful knowledge is required because the problems which come under this head are numerous and of very different kinds; as, for example, in the case of the conducting of water. For at points of intake and at curves, and at places where it is raised to a level, currents of air naturally form in one way or another; and nobody who has not learned the fundamental principles of physics from philosophy will be able to provide against the damage which they do.[3]

He described different kinds of water, and he briefly touched on cisterns. He described how the roof should be constructed to deliver water into the atrium cistern.[4] He warned against the use of the displuvate roof, in which water was conducted to the exterior of the house, that is, to the party wall between adjacent residences.

> It is, however, very troublesome to keep [the dipluvate house] in repair, because the pipes, which are intended to hold the water that comes dripping down the walls all round, cannot take it quickly enough as it runs down from the channels, but get too full and run over, thus spoiling the woodwork and the walls of houses of this style.

He was providing the first description of the dreaded horizontal or "dead" roof valley, which has plagued architecture ever since. Much of what we know of Roman water management we know through archaeology, rather than through Vitruvius. Roman water management was aimed at managing a scarce resource, rather than disposing of an unwanted damaging force.

Gothic Era

Drainage of the medieval cathedrals was good. Water drained down the steeply sloped roofs toward first stone, then lead- or zinc-lined, guttering systems to gargoyles. The gargoyles provided inclined channels for the discharge of water well away from the walls of the building. Wind provided for random sites for water deposit. The area surrounding the cathedrals has changed much over time. However, all indications are that the soil surface surrounding the cathedrals sloped outward from the cathedrals. Choisy and Viollet-le-Duc both indicate that downspouts occasionally substituted for gargoyles as early as the thirteenth century, in the cathedral at Amiens for example.

In medieval buildings, when drainage problems occur they are quite likely to be the result of later interventions. It is risky to stereotype epochs and cultures, but for the sake of argument, one may characterize the drainage skills of the cathedral builders as good. We know the identities of few of the medieval builders; perhaps it is their anonymity that helps us to maintain the vision that the techniques of water control arose not so much through individual acts of genius as through an iterative, empirical--evolutionary--process. Drainage was, for once in the history of western civilization, celebrated. The artistic and technical intents were indissolubly intertwined.

The Academy

This intertwining began to unravel in the late Renaissance. As it did, responsibility for getting the water away from the building lost its assignment. One may venture to say that the crack through which water enters the building is the crack between the artistic and technical intents of the designer. The period that may be most pertinent to the subsequent history of water management in buildings may be the introduction of architecture into the French Academy of Fine Arts in 1671.

At the beginning of the reign of Louis XIV, construction was managed by the guilds. These were loosely-organized companies/associations that arose during the medieval era and remained somewhat intact through economic cycles in a new mercantile world. They were secular and, for the most part, bourgeois. Colbert, the Superintendent of Finances and manager of the building program for the monarch, sought a way to control construction costs. In 1671, he instituted the academy of architecture. Pevsner describes his motives:

> For though Colbert also wanted to sever art from guild, his only aim in carrying this out was to tie art more firmly to the court and the central government. Guild organization seemed humiliating to him...While dignity and freedom were the motto of the struggle in the Cinquecento (the Italian Renaissance of a century earlier) it was now dignity and service.[5]

Academic architects were set up to receive commissions of the king who sought thereby to break the power of the guilds. Much of the sociology of the construction industry today can be traced to this seminal incident of union-busting.

This fact helps to explain the chasm that has separated builders from architects for over three centuries. Allsopp faults the intellectualization of the arts that took place in the earlier Italian Renaissance:

> It came to be accepted that the practice of the arts of architecture, sculpture and painting could be learnt by the application of precepts established by rational thinking and that the precepts could be exactly expressed in words that they could be conveyed to any intelligent person. This theory enabled Colbert to drive a wedge to separate the artist and the craftsman, so destroying the lingering tradition of the medieval guilds and preparing for the abyss of nineteenth-century taste.[6]

The placement of government contracts with the new group of academicians did not spell the immediate end of common sense in building practices. Blondel, who had been placed at the head of the new academy, was an accomplished

technician as well as administrator. Good habits do not die easily.

The Pantheon

Within a century, the intellectualization of construction led its the first monument, the Pantheon in Paris by Soufflot. Allsopp does not hold back:

> It was started in 1757 and the architect, Jacques Germain Soufflot (1709-1780), achieved the long, frustrated ambition of Renaissance architects to build a church of cathedral scale on the Greek cross plan. It is perhaps appropriate, and certainly instructive, that this triumph of architectural theory over common sense and the functional requirements of a church has been turned into a mausoleum.[7]

Soufflot's design was innovative in many respects. It had roof sections of *very low slope* leading to water channels - all out of Paris stone with mortar joints. The dome, modeled on Wren's St. Paul, caused radial displacement, opening up the mortar joints in the water channels and allowing the embedded iron cramps (another innovation) to rust. Eight years ago, when severed stone sections fell onto a crowd of visitors, the central room was closed to visitors. The Pantheon is once again undergoing restoration. Half of the roof is being redone, with zinc and modified bitumen covering over the exposed masonry roofs.

The Modern Movement

Richard Pommer[8] traces several strains that led to the use of the low-slope roof in Germany at the outset of the twentieth century, including Albrecht Dürer, who argued that low-slope roofs offered less resistance to wind, put less weight on walls, were cheaper to repair, and were safer in case of fire. He relates the story of Johann Winckelmann "the first hero of the flat roof in Germany" at the outset of Neoclassicism.

> In his *Observations on the Architecture of the Ancients* of 1762, Winckelmann wrote that the roofs of houses in Antiquity were flat or flat-crowned, as they still were in Italy. When he returned to Germany a few years later, he cried out as he crossed the Alps, "O what a silly way to build - look how pointed those roofs are!" Their aspect threw him into such a bad mood, we are told, that he returned suddenly to Italy, where he was murdered. Neoclassical flat-roofers still cited this incident decades later.[9]

Viollet-le-Duc

Eugène-Emmanuel Viollet-le-Duc may have been heavy-handed in his approach to historic fabric. Nevertheless, but he was the first architectural theoretician to seriously address the importance of drainage and the failure of academic architects to achieve it.

> The rapid and easy escape of the rain-water is one of those problems which must be encountered in every building, and which is generally resolved in a very imperfect manner. The *mode majestueux* does not take heed of these necessities; yet it rains in France, and it would be in every case worthy of consideration how to provide the simplest means of preserving buildings from the inconveniences thence resulting...In Gothic edifices the carrying off of the rain-water determines certain arrangements which dictate the exterior of the structure. Except in rare cases, these means for the escape of the water are apparent, easy to inspect, to keep in repair, and even to replace; they take the shortest way, and, passing over the surfaces, they cannot endanger the durability of the structure itself.[10]

This was the clearest expression of the exigencies of rainwater drainage to have appeared up to that time. It has not been equaled since. The reluctance of later architecture literature to contend with rainwater drainage cannot be excused by the lack of a model. Perhaps the excuse is the effort later architects have made to distance themselves from a craft-based model.

Viollet-le-Duc provided detailed explanations of the difficulties architects make for themselves. His concerns are not found elsewhere in the literature of architecture, at least with the elegance of expression, that he is quoted at length here:

> In the present day municipal regulations prohibit the discharge of water by gargoyles into the street. It must be carried down to the ground, and even beneath it into drains. This is certainly a necessary prohibition, but our public buildings ought to be so contrived that the escape of the rain-water may not take place, so to speak, clandestinely. To carry down as an after-thought cast-iron pipes against fronts, through string-courses and cornices is a barbarous procedure, and one that denotes a complete absence of forethought on the part of the builder; to carry them down through the thickness of the masonry is very dangerous, and sooner or later causes dilapidations which cannot be perceived until all the mischief possible is

done. How, in fact, can we be aware of the bursting of a pipe caused by frost or settlement, if this pipe is completely buried in the masonry? It is only when the wall is saturated with moisture that the cause of the mischief can be ascertained, and it is then too late to obviate it. If the building is sufficiently massive to allow of spacious vertical shafts being left in the thickness of the walls, adapted to receive down-pipes which could be easily inspected and replaced at need, all difficulty would be obviated, and we could dispense with external down-pipes on the fronts; but such cases are rare, and there are but few, even among public buildings, where the room could be thus afforded. In most cases, therefore, the rainwater pipes must be put on the outside. They why not frankly prepare a place for them? Why afterwards cut through cornices, string-courses, and plinths to make a place for these pipes, which then present the appearance of an after-thought and break all the lines of a design which was not arranged to receive them?

The extent to which the absence of forethought on the part of architects is carried is incredible to those who have not observed it. For instance, in a public building erected not long ago, the gutters pass through the attics, and form in each room, under the windows, a little trough covered with a board, and where water may be drawn any rainy day; and the down-pipes carried through the thickness of the walls, pour torrents of water into the rooms during a thaw; and all this for the sake of not interfering with the lines of a certain classical form of architecture. Generally, when we thoroughly examine these monumental facades, which seem to be built solely for show, we discover much poverty beneath this useless luxury of stone. Those who live behind their costly walls are soon made aware of it. Here you have gutters passing under your feet; there down-pipes which periodically flood you, and deafen you with their rush of water on rainy days.

Note that it is not a medieval sensibility, nor a medieval morality, and certainly not a Gothic aesthetic that is receiving praise here. Rather it is the designer, responsible for horizontal cornices, who is equally responsible for vertical down-spouts. Viollet-le-Duc's presentation of how this would be accomplished is shown in Figure 1. This notion of integrated art and craft lasted in France through the rationalism of Choisy and the stylism of Art Nouveau, then died.

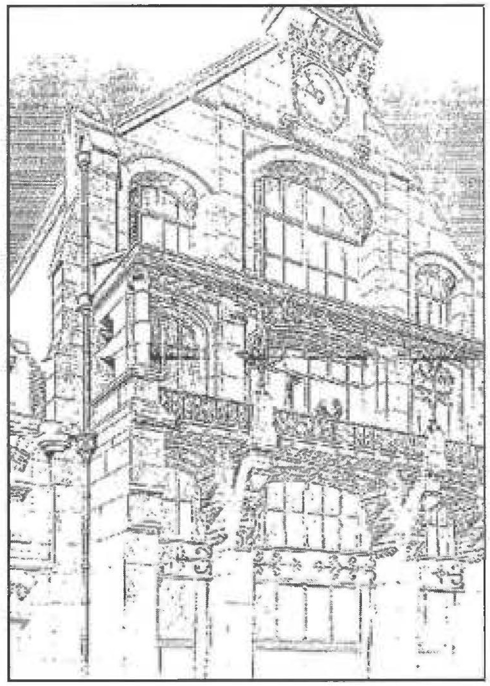

Figure 1. Plate from Viollet-le-Duc Lectures on Architecture *showing integrated horizontal cornices and vertical rainwater drainage.*

Viollet-le-Duc did not address flat roofs in his 1000 page *Lectures on Architecture.* His aim was to use the historic fabric of France that remained after the Franco-Prussian war for purposes that were pedagogic and patriotic. Flat roofs played no part in this aim.

The German Heimatschutz

The Heimatschutz or preservation movement originated in Germany in the aftermath of the Franco-Prussian war of 1871, which, according to Pommer, "disfigured the German landscape with a violence unequaled on the Continent." This movement associated German-ness with Nature and the Picturesque, and the engineer and machine with straight lines and placelessness. Their logo is shown in Figure 2. The use of flat roofs, according to one of the founders Karl Schmidt, could drive a wedge between "the image of the homeland we have within us and the view of the world without."[11]

At the end of the nineteenth century, this view was opposed by modernists such as Otto Wagner of Vienna who wrote "the horizontal line, the surfaces rendered as flat planes, the greatest simplicity, and an energetic bringing out of the structure and materials will dominate

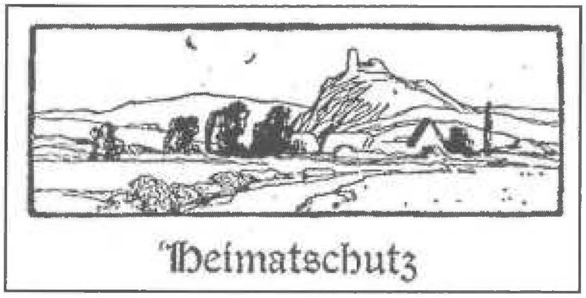

Figure 2. Logo of the Heimatschutz, the German preservation movement, around 1900.

future, progressive and novel forms of art."[12] Pommer says that his quote was interpreted later as a plea for flat roofs. He cites Freidrich Naumann, a progressive social reformer and later a founder of the German Werkbund, who encouraged flat roof construction, and concludes:

> Now the controversy over the flat roof was joined as a dispute between two circles of reformers seeking to come to terms with the disruptions caused by industry: those wishing to stem the tide and those hoping to ride with it. This conflict gave the flat roof in Germany which I shall call its modernist connotations.[13]

Note that the German *flat-roof modernists at the turn of the century defined themselves as a group ideologically opposed to the Heimatschutz or preservation movement.*

In the first two decades of the twentieth century in Germany, the extreme positions found middle ground with the formation of the Werdandibund group, in which preservation would be supplemented by contemporary art that was still "properly German." This group sponsored a competition to determine if flat roofs, along with steep roofs, could be integrated into the environment. The entrants seemed to read the program well, and they all came in with compromise low-slope roofs. But the Heimatschutz found out that the prize money for the competition - 10,000 marks - came from a tar paper manufacturer worried by the inroads of the protectionist laws. The suspicion of selling out to industry forced a public break between the preservationists and the middle-roaders, and this suspicion tended to further "purify" the Heimatschutz position.

In 1922 Walter Gropius sent a questionnaire to his fellow architects requesting their input on the technical feasibility of flat roofs - their waterproofing, insulation, flashing and gutters. He omitted any mention of style, writing later that the "flat roof in itself, like every other constructive feature, is to start with neither 'beautiful' nor 'hateful'." For the Communist architect Ernest May, the technical problems of the flat roofs had been overcome, and so the flat roof possessed "an ethical force" as "a new, living expressive form" suited to counter "the chaos of mansard roofs, saddle roofs, shed roofs and the like" that were ruining the cities. For Mies van der Rohe, flat roofs were the emblem of the impending victory of a new architectural style. Mies wished to make the flat roof an art-political symbol in the Wiessenhof exhibit of 1927.

As Pommer points out, in the torn fabric of Weimar society, art-politics became inseparable from real politics.

The Weissenhof Exhibit

A watershed event in the Modern Movement was the *Weissenhofseidlung* (housing development) in Stuttgart of 1927, which showcased the New Building, the New Objectivity, shown in Figure 3. Mies van der Rohe was the director of the project. He invited the most renowned architects of the time to participate, and they did. During planning sessions, according to Richard Pommer and Christian Otto:

> The flat roof emerged in this analysis and throughout the debates as the preeminent symbol of the new architecture, both for its advocates and its opponents. The controversy repeatedly came back to it because the councilmen realized that the flat roof could not be easily justified by the usual claims of *Sachlichkeit* (objectivity) and practicality made for the *Neues Bauen* (New Building). Their unease forced Sigloch (the deputy mayor of Stuttgart) to rebut the persistent charge that the roof could not be made watertight and to defend its regional suitability by citing earlier examples in Stuttgart, notably Paul Bonatz's railroad station. But the politicians and their advisers could not fully comprehend the ideological, as distinct from the stylistic functions of the flat roof: that it was the emblem of the closed ranks of the Modern Movement and indispensable to enforcing unity at Weissenhof, a sign which could not be tampered with.[14]

In opposition to the modernists were the Nationalists, with the chauvinistic position that "true art grows from the soil of a living national

heritage."[15] When the project went up for a vote it passed; the Nationalists split their vote because they could not completely resist the gift of federal tax monies for the middle class at Weissenhof, whatever the style and influence of foreign architects.

Paul Bonatz, the Stuttgart architect mentioned above, followed the conservative strains in the early Werkbund, the Heimatstil, which sought the restoration of German regional and pre-industrial values. His participation in the Weissenhof exhibit was debated by Mies and, in the end, he was not included. He accepted flat roofs, but he criticized the closely packed cubes of the site model, writing in a notorious phrase that it looked more like a "suburb of Jerusalem" than a housing project for Stuttgart.

In many writings, flat roofs were termed "oriental," referring to their Middle Eastern and Mediterranean use. In the nineteenth century, this suggested warmth and ease - altogether desirable. This position was adopted by the modernists, for many of whom (LeCorbusier, for example) hygiene and health pointed toward playgrounds in the sun. The Mediterranean connoted communal self-sufficiency. Attachment to the Middle East and the Mediterranean connoted internationalism, in direct contrast to the Nationalism of the revivalist style and movement. But a more sinister interpretation of the term "oriental" arose in Weimar Germany during the 1920s. Paul Schultze-Naumburg was a propagandist for the Heimatschutz. Before World War I, his writings showed only mild opposition to the tar paper flat roof. But in 1925 he met Hitler in Munich and became an admirer of the National Socialists. He came to argue that architecture was more determined by race than by climate. The Modern house, he said, as quoted by Pommer, was in effect a "stationary sleeping car" which could be moved anywhere as demanded by the "nomads of the metropolis, who have long lost the idea of a native land (Heimat) and are not at all acquainted with the idea of the parental, let alone the ancestral, home." These people offer models "which no longer keep us under German skies and on German soil, but displace us to the edge of the desert or into an oriental setting.[16]

Pommer says that "nowhere does Schultze-Naumburg actually blame the Jews for flat roofs. It is all done by innuendo: the roofs come from the Orient, and the Jews come from the Orient." In Heimatschutz literature the flat roof house became the "roofless" house, "recalling the rootlessness of modern urban man and the Jews." Emil Högg, a Heimatschutzer from Dresden, openly associated the hated flat roof with Bolshevism. In the "rougher times" of 1934, the Heimatschutz of Stuttgart published the notorious faked photograph of Weissenhof as an Arab village (Figure 4).

The Weissenhof exhibit accomplished a rare feat - sixteen architects from four countries constructed buildings on a single site which had an unmistakable uniformity. That uniformity was in direct contrast to the past and its defenders in the present. The accomplishment was given ambitious names like the New Objectivity, which declared the obvious correctness of the art-political position because so many diverse architects found themselves in such uncanny coherence. But the key to the coherence was strikingly simple - all the houses had flat roofs.

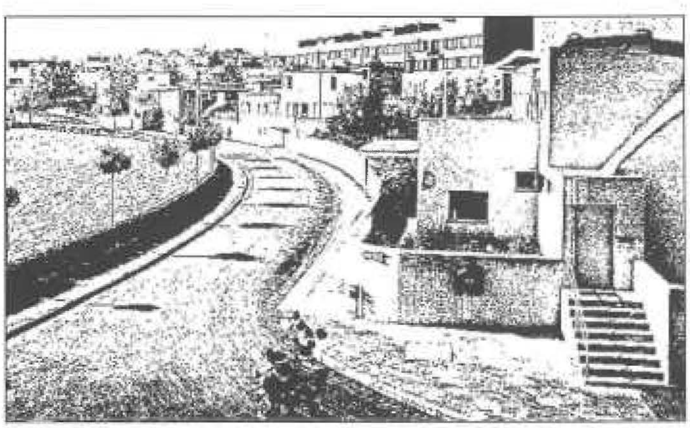

Figure 3. Photograph of the Weissenhofseidlung, *the Stuttgart housing exhibit of 1927. The flat roofs were adopted as the principal emblematic feature of the International Style.*

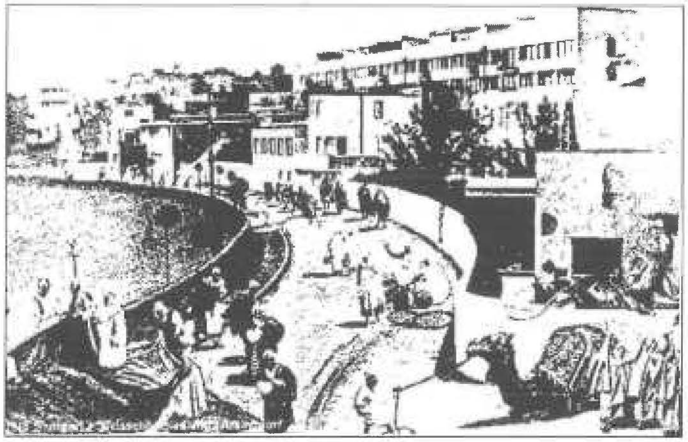

Figure 4. Postcard from 1934, ridiculing the Weissenhofseidlung *and its International style.*

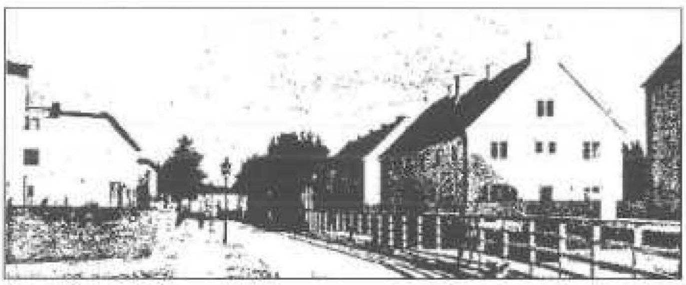

Figure 5. Berlin housing development, site of the "War of the Roofs."

Mies van der Rohe had insisted on flat roofs for the project.

Here are two reactions from the public to the Weissenhof exhibit: "Why, in particular, the defense of the flat roof which is considered an essential feature of the new architecture, on grounds of saving in cost? The essence of cubic constructional style has nothing to do with practicalities" and "It is the New Form that ordains the flat roof and causes acceptance of all the manifold still-to-be-foreseen disadvantages which that brings in its train."[17]

The curious "War of the Roofs" occurred in Berlin in 1928. The socialist Gehag society had built the Onkel-Tom's-Hütte (Uncle Tom's Cabin) development, designed by Bruno Taut and others. The houses had flat roofs. Across the street, the bureaucratic workers' society Gagfah demanded small traditional houses with pitched roofs. The director, Heinrich Tessenow, who had turned down an invitation to build at Weissenhof, found architects who would comply (Figure 5). The result showed that by 1928 the ideological standoff that the two roofs represented was more important than conformity or the quest for harmony on project development. The flat roof had become a statement so politically charged that all other considerations were subordinate.

Conclusions

An attempt has been made to present a polemical history of roof drainage and flat roofs. The history shows that in regions of high temperature and low rainfall, indigenous flat roofs have been very successful. In Northern climates, steep roofs are appropriate responses. The Gothic cathedrals even celebrated the functions of roof drainage.

In the late Renaissance, particularly with the foundation of the Academy under Louis XIV, a rupture occurred, in which the evolutionary improvement of roofing systems gave way to a revolutionary intellectualization of construction. Roof drainage functions were beneath mention in the literature of architecture that developed beginning in the seventeenth century. It was not until Viollet-le-Duc that roof water drainage found clear descriptions in which it was given an integrated place among design requirements.

In the Modern Movement, design elements had a higher symbolic than performance value. This is particularly true of the flat roof. Proponents of the International Style adopted the flat roof, as seen in the Weissenhof exhibit, as the unspoken emblem of membership in the New Objectivity. Opponents of this movement, in particular the Nationalist preservation movement in Germany, assigned derogatory meaning to the flat roofs of the Modern Movement, implying even a racial disparagement.

In the United States, much of the vituperative symbolism of the flat roof was diluted. Nevertheless, American literature continued to ignore the performance of roof systems in their discussions of architectural elements.

Notes

[1] Reyner, Banham, *Theory and Design in the First Machine Age* (Cambridge Massachusetts: The MIT Press, 1980), Chapter 1.

[2] Personal communication, Professor Eric Hostetter.

[3] Vitruvius, *The Ten Books on Architecture,* Morris Hickey Morgan, translator. New York, New York: Dover Publications, 1960 (reprint). Book I, chapter 1.

[4] Ibid., Book VI, chapter 3.

[5] Nicholas Pevsner, *Academies of Art Past and Present* (Cambridge, England: Cambridge University Press 1940), 109.

[6] Bruce Allsopp, *A History of Renaissance Architecture* (New York, New York: Pitman Publishing Corporation, 1959), 119.

[7] Ibid., 129.

[8] Much of the discussion of the flat roof in Germany is from Richard Pommer, "The Flat Roof, A Modernist Controversy in Germany," *Art Journal* 43, no. 2 (Summer 1983), and Richard Pommer and Christian F. Otto, *Weissenhof 1927 and the Modern Movement in Architecture* (University of Chicago Press, 1991).

[9] Pommer, "The Flat Roof," 158.

[10] Eugène-Emmanuel Viollet-le-Duc, *Lectures on Architecture,* Volumes 1 and 2 (New York, New York: Dover Publications), Book 2, Lecture XI, 44.

[11] Pommer, "The Flat Roof," 160.

[12] Ibid., 160.

[13] Ibid.

[14] Pommer and Otto, 28.

[15] Ibid., 30.

[16] Pommer, 165.

[17] Karin, Kirsch, *The Weissenhofseidlung* (New York, New York: Rizzoli, 1987).

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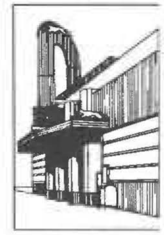

Energy Conservation Issues for Modern Buildings

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Synopsis
This paper is a "Vertical Look" at energy conservation successes and failures at the vertical perimeter envelope, (walls and windows) in buildings of the twentieth century that we are now looking to preserve.

First, a brief timeline is presented of significant energy events in America leading up to the twentieth century. The next years that followed, which could be called the energy "yo-yo" years of 1920 to 1960, are then examined in detail. This is the period when our cultural history went from its highest economic extravagance to its lowest depression poverty and back again to economic highs, complete with wilful waste of resources. The inter-relationship of three critical influences which shaped our buildings of this time are discussed. These are:

- Energy economics
- Building systems technology
- Construction materials technology

With some buildings of this period now becoming recognized as significant structures in history, we must learn safe ways to preserve them. Preservation approaches which have been promoted over the last thirty years are examined here for their effectiveness. These issues become even more complex as modern economics influence the preservation actions we take today.

In the Beginning
Ever since the Pilgrims' arrival in New England in 1620, the forces of energy conservation have been at work in America. That wood was plentiful as a source of heat and thermal insulation for their buildings was least on their mind. Their real need for energy conservation was in summertime when straw was used as an insulation in ice houses where perishable foods were stored.

During the eighteenth century, wood continued to be plentiful and coal further supplemented it as a low cost source of energy for both warmth and manufacture of iron products. During this era, both Benjamin Franklin and Benjamin Thompson developed methods of heating in buildings that, for the first time, were efficient, although in a crude fashion.

Then, at the turn of the nineteenth century a great iron revolution occurred when the energy of coal; discovery of vast iron ore deposits; and a few persons thirsting for power all got together. The outcome was the beginning of today's building construction methods that generally use the latest technology available at the time. For the wealthier and more adventurous, this period also included bold experiments in unorthodox building construction techniques. These tests were often extensions of the technology that their owners were employing, or considering, in their other industrial endeavors.

The results of these activities created a broad division between building construction materials, namely wood and masonry. Each went its separate way, with solutions that ranged from the most basic functional design to the most extravagant.

In wood structures, it was rare to find any specific thermal insulation features outside of the addition of sphagnum moss or brick nogging. Some historians believe that the nogging was also used as fire protection or a

rodent barrier. Instances of birch bark have also been reported as used to provide a weather barrier under exterior wood siding. Mud has also been found in wood construction voids to act as a weather barrier.

In reality, relatively good thermal insulation values were obtained by the usual combined composition of exterior wood siding, a plank sheathing beneath, a three to five inch cavity, and a heavy plaster finish of about one inch over wood lath on the interior. Although these builders had not studied thermodynamics theory or moisture migration computer models, their construction methods acted to produce excellent preservation results. The key to the longevity of this construction is in the fact that the most impermeable material (plaster) is on the building's interior side and the most porous (loose wood siding) is on the exterior. This built-up composite produces a reasonable insulation value and the numerous construction joints allow easy infiltration of air through the composite of materials. The infiltration action is a key factor needed to dilute migrating moisture, which is the primary deterioration force in a building where it accumulates.

The masonry buildings of this era were also well able to withstand the deterioration test of time. Their secret to longevity has been in their massive continuous perimeter thicknesses. By being a heavy construction of brick, stone and mortar, all well bonded to each other, the needs for preservation are satisfied. Generally, insulation values of 0.4 BTU/ft^2 degree F or lower are achieved so that surface condensation is minimized. Because of this homogenous, bonded composite, internal wall condensation is avoided due to the natural three-dimensional diluting forces of infiltration. These forces far exceed those of the classic theoretical vapor diffusion model. As a result, so long as the masonry is kept warm - the building heated - the forces of deterioration will be kept to a minimum. It is noted that "rising damp" is a special situation of liquid saturation in a material.

The Yo-Yo Years

As the twentieth century got underway, America was on a "cultural roll" with unlimited fuel and synthetic product resources from the new-found petroleum expanse beneath the country's feet. This cultural roll was more of a yo-yo as we look back at it today. It is significant to recognize that both the country's economics and its built environment followed the same path.

The combination of energy, technology, and materials development raced through the early twentieth century with incredible speed and momentum. This high-speed style influenced the design characteristics of the buildings erected in this era. The timeline of up and down economics is clear. First, until about 1910, oil, Henry Ford, and electricity put the country into a frenzied search of comfort and adventure. While the times of the 1920s were nearly ideal, the Depression of the 1930s drove the population into deep poverty. Two wars later, and with hard-earned wisdom, the good times started to roll again. Cars were no longer black, blue-collar workers got good pay, and mom stayed home with the kids.

With these remarkable ups and downs in the economy, all within single generation, a great variety of factors influenced the building construction industry over a short period of time. During the "down" times of the Depression, energy conservation was so important that the heat was just not turned on. Efficient new building envelope insulation materials were introduced, but the technology of these materials was still in its infancy. Building systems were also still quite crude because there had not been any real driving force to make them efficient.

It is important to understand the events of this era because its buildings exhibit a wide range of thermal characteristics. We should not expect to find much insulation in the walls of 1920s buildings or 1930s buildings. Only in the 1940s did insulation start to happen along with window thermal improvements. By the 1960s, energy was cheap and many houses were being heated by baseboard electric units. It boasted a low installation cost and individual room zone temperature control. Fiberglass insulation was placed in perimeter walls as a part of these installations. Fiberglass insulation then began to flourish in the perimeter cavity spaces of wood and steel framed buildings throughout the country's temperate regions. It also started to appear in southern regions as central air conditioning became popular. The practice of filling wall cavities with insulation started a new conflict between the forces of energy conservation and building deterioration.

When the oil embargo of 1973 occurred, the country committed itself to a new age of energy conservation. It was advertised that great

energy savings could be achieved by insulating perimeter walls and attics by high-speed injection of blown-in insulation and the like. Today we see the results of these steps in the rotting of wood framing members and premature paint peeling on exterior surfaces.

Many high-speed building construction short cuts were used during these times including "tar paper," felt paper, artificial brick siding, and aluminum siding. Inadequate venting of perimeter wall cavities became the norm. To this day, there is still confusion about where and how building perimeter siding, insulation, vapor retarders, and infiltration retarders should be arranged.

Recent Preservation Approaches

During the last half of the twentieth century, the yo-yo like cycle has continued in economic issues and building preservation approaches. During the 1960s energy was cheap and we lived in a time of seemingly unlimited resources. We thought nothing of willful waste. But in 1973, our Arab neighbors reminded us of the delicate resources of oil energy in their land and a new commitment to energy conservation ensued. In fact, now that the 1980s have passed, we have discovered perhaps our first evidence of excessive energy conservation. In our occupied buildings, complaints of "sick building syndrome" are beginning to surface. This situation is unique because the very HVAC systems which are intended to provide occupant comfort are largely being blamed for causing occupant discomfort. For the most part, the complaints can likely be traced back to issues of insufficient infiltration through a building.

Modern buildings are often "thin skinned" consisting of perimeter walls constructed with thinner synthetic composite materials. These materials have very high thermal insulation efficiency and are tight barriers to infiltration. From a building preservation standpoint, this does not worry the designers because they have no desire to ever control humidity in the building's interior. (It is noted that few buildings are intentionally planned for historic preservation at the time of their construction.) This is where a misunderstanding occurs, because the designer's textbooks do not address the combined critical dynamics of infiltration and moisture migration at a building's perimeter. This was not recognized in the past because infiltration rates were always high, with values of around four air changes per hour or more. New, tight construction has reduced infiltration values to one air change per hour or less. Various federal agencies are now proposing mandatory regulations that will address this issue.

In summary, looking back at the last thirty years of building preservation practices, we have seen the pendulum swing from one extreme to the other. Perhaps, we should now look to a middle ground as a realistic preservation approach. The pendulum pattern has been as follows:

1970 - "Leave It On Technology"

During the 1960s energy was cheap, taxes were low, and non-profit preservation societies largely used the preservation techniques of "Leave It On Technology." Things were left turned on around the clock and room temperature was held at 70°F all winter long. Historically preserved buildings were largely unoccupied and lacked the routine small amounts of moisture generation inside as created by their predecessor's occupancy. Tests have shown that a typical occupied residence generates about ten pounds of moisture a day. Needless to say, these recent past high and dry environmental conditions caused wood to split, veneers to delaminate, and paints to shrink and separate.

1980 - "Turn It Off Technology"

Just as the oil embargo hit, the preservation community was seriously questioning the wisdom of maintaining year-round comfort temperature in the nation's landmarks. So the pendulum swung full cycle in opposition to the oil price increases and a new philosophy was established. It was that of "Turn it off Technology."

We went from one extreme of non-stop heat to the other of no heat at all within a period of a few short years. The "turn it off" approach has been just as dangerous to collections as the "leave it on" approach, but in the opposite direction.

To some, it seemed to be a logical conclusion to say that materials were not climate controlled in their past and thus, should not require it today. This makes good sense, but not to heat a building at all in the northern United States during winter is not the same as the lack of climate control in the past. Continuing research and monitoring data is showing time and time again that no heat in a building is a high risk to accelerated deterioration. Examples include:

- Increased mold activity
- Increased rising damp action
- Increased masonry foundation spalling
- Chimney flue deterioration
- Interior paint flaking
- Wallpaper separation

Considering past history, it can be seen that newer buildings would be even more susceptible to these difficulties than older buildings where construction was not as tight.

1990 - Computer-Operated Technology
If a building is not to become a sacrificial object to protect its interior collections, some middle ground is needed. And further, achieving this balance between the complexity of constant changes of weather, time of day, occupancy, and needs of collections, logically puts us into a new age of "Computer-Operated Technology." Preservation approach choices should not be black or white, but should be continually changing to offset constantly changing uncontrollable events. The key to it all is in the use of accurate measured data. New high-tech sensing devices can continually measure the pulse of a building and make adjustments to an HVAC system's operation. By monitoring critical physical elements, deterioration risk can be minimized and preservation equilibrium can be maximized.

So Now What? - Some Do's and Don'ts

- Does my barn need heat?

The less heat that is used, then the more ventilation that is needed. Old plank barns that leak like a sieve keep standing because high infiltration keeps them dry. Excessive masonry thicknesses in temperate regions may need more than just ventilation. Monitoring and analysis is needed here. My experience indicates that heated masonry buildings outlast unheated masonry buildings.

- Do not insulate an unheated building!

Adding insulation to an unheated building is disastrous. It reverses all its self-drying behaviors. It creates a terrarium that is self-wetting. Infiltration is reduced, building mass stays cooler longer, and a rapid spiral to moisture saturation results. A similar result occurs when storm windows are placed on an unheated building, but to a lesser extent.

- Keep fireplaces and chimneys dry.

It has been a long-standing preservation practice to cap chimneys. We have found that this does not necessarily keep them dry. There are many forces of nature at work in a chimney all at the same time. Research is continuing to address effective ways to keep this masonry dry.

- Use progressive porosity.

In designing a perimeter wall for a temperate region, always have the most impermeable element close to the room interior. The ideal location for insulation is the exterior, but this is usually not practicable. All materials outboard of a vapor retarder layer must be vented to the outside, including the insulation. The materials within the wall composition must be progressively more porous as they get closer to the outdoors. This is why wood clapboard siding should never be caulked shut.

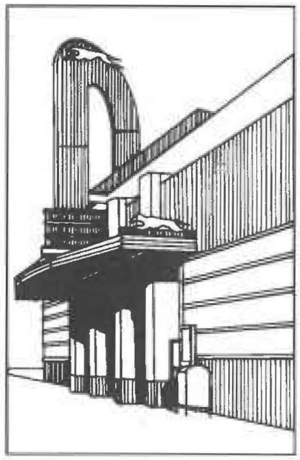
In southern regions the reverse situation occurs. It is still best to keep as much of the wall materials as possible warm, which in this case is at the exterior. Old buildings in the south have been preserved naturally by the drying forces of ventilation and solar heating.

- Interior versus exterior storm windows.

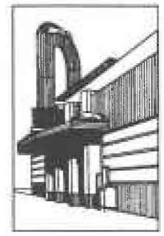
In temperate regions, storm windows should only be used if heating is to be performed. Then, the rule is tight inside and loose outside. The cavity space between the layers of glazing must be filled with outdoor dryer air. Never caulk exterior storm windows shut.

- Six on and eighteen off!

The daily solar cycle is not twelve hours and twelve hours. The vast majority of the solar heating portion of a day is about six to eight hours in temperate regions. This is the time period when a building's perimeter materials are subjected to drying forces. The other eighteen hours are the opposite. During this period the building's materials will absorb moisture from their surrounding environment at varying rates depending on their hygroscopic characteristics. This cycle repeats every day with equilibrium occurring twice a day so long as saturation is not present. This is why gross building daytime ventilation is important when no other forms of climate control are present. It should be employed in weather above freezing. This enhances moisture desorption and retards its absorption.



Historic Cover-ups



Stonewalling America:
Simulated Stone Products, 1920s - 1940s

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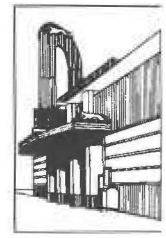
Abstract
Simulated stone played a large role in the changing aesthetics of the American public in the 1930s to 1960s. These products were marketed to be used in new construction but were widely used on existing buildings. Installation of simulated stone was seen as an easy way to update an existing building without incurring the cost of actual stone construction, while conveying a sense of permanence. Many buildings proudly wear their signature plaque stating which company's product was utilized. Several different companies developed products in the 1920s and 1930s; three specific examples are Rostone (Lafayette, Indiana); Formstone (Baltimore, Maryland); and Permastone (Columbus, Ohio).

It is difficult to give a concise definition for simulated stone. It covers a number of products manufactured to mimic the look and characteristics of stone. These products, though, can be divided into two major categories according to their manufacturing process: 1) a mixture of shale, natural stone, alkaline earth, and water which is formed into a specific shape and compressed to produce a stonelike product and 2) a cement mortar applied directly onto a building substrate, then molded or shaped to resemble the texture of stone and struck to create mortar joints.

Simulated stone products do not have the same lengthy history as many other building materials. They have, as their basis for invention and promotion, a common philosophy with such materials as cast iron and cast stone - an attempt to mimic an accepted material without the costs or problems inherent in the original material.

When each of these simulated stones, Rostone, Permastone, and Formstone, were initially marketed, they were hailed as thoroughly modern inventions. Using the stereotypical tradition of stone as implying wealth, stability, and grandeur, these products were sold as the modern version of a natural stone. They simulated the look of natural stone, while providing an inexpensive way for middle-class America to enjoy the prominence of a stone house. Many of the companies' advertisements stress this opportunity as a chance to take part in modernizing your house or building to a level of "class" as would never be possible without their product.

While these simulated stone products were all the rage in the 1940s and 1950s, there was a strong backlash in the early 1980s. As the popularity of restoring historic buildings soared, it was seen that these products needed to be removed as they were hiding historic materials. Today, these products, Rostone, Permastone, and Formstone, are reaching the point where they, too, have historic value. Homeowners who fifty or sixty years ago installed Formstone "for the beauty, and to protect the home from weather" have created a challenge for those who study building materials. Several options are available, based on the condition of the simulated stone product and the historic nature of the original building, as a starting point for further discussion.



Asphalt Siding: An Artificial Reality

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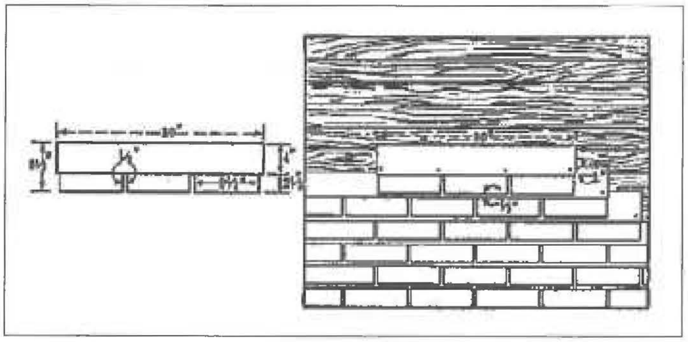
Introduction
Asphalt siding is one of many new building products of the twentieth century designed specifically for the renovation of older structures. This very concept, a material designed as a covering for existing materials was a fairly new development, but one that evolved from the roofing industry, where the cycle of replacement materials is the norm. Historical precedence for the use of covering materials can be found in the nineteenth century, when the production of stamped metal siding in imitation of brick, stone and sometimes wood enjoyed popularity in the commercial building market. Stamped sheet metal coverings for entire building elevations were popular in small towns during the 1890s and the first decade of the twentieth century. However, metal building panel systems were not very popular for residential buildings, and it was not until the early twentieth century that materials specifically designed for the residential structures - asphalt shingles and siding - took off. Asphalt shingles and rolled roofing, the immediate ancestors to asphalt siding, were first produced around the turn of the century, though built-up asphalt roofing has it beginnings in the mid-nineteenth century.

The acceptance in the marketplace of asphalt siding can be attributed to a number of factors, but primary among them was its economy and ability to imitate brick structures. Brick has always been viewed as a superior residential building material, and owners of frame structures were pleased with the "upgrade" of their house's appearance to that of a brick structure. Early product lines for asphalt siding did offer siding that duplicated wood clapboards, but this did not catch the public's attention. Virtually all the manufacturers of asphalt siding produced products that imitated brick, and some took great care to produce mortar lines in contrasting colors such that the best examples are very similar to brick buildings. Very little use was made of asphalt siding in new construction, though there are examples of ranch houses of the 1950s that do have insulated asphalt siding as the original surface.

General Description
Asphalt siding is a variation of asphalt roofing as either shingles or rolled roofing materials. The surface of the siding is embossed or variously colored to simulate an architectural wall material such as brick or stone. The actual surface itself is composed of small ceramic granules embedded in an asphalt-impregnated felt base. Asphalt siding was sold in three principle forms: individual shingles, rolled sheets (a typical dimension was 15 inches by 43 feet), or rigid strips in which the asphalt material was affixed to an cellulose substrate that provided some insulation. A typical wall panel covered approximately eight square feet and was less than an inch thick. The edges were rabbeted so that overlapped pieces fit smoothly and disguised the joints. Insulated siding material was also produced in a rather stylized and abstracted imitation of wood shingles. Insulated asphalt siding was particularly popular in the 1950s and produced in then-popular colors such as pink and gray.

Formation Process
Asphalt siding in all of its various forms was produced by the same companies that made asphalt roofing shingles, and the basic production methods and materials are virtually the



Asphalt siding shingles in imitation of brick. Source: Herbert Abraham, Asphalts and Allied Substances, 1963.

same. The basic process is one in which small colored mineral or ceramic granules are embedded in an asphalt saturated felt. The asphalt is the primary water repellent agent. The felt is much like a large piece of thick paper and is saturated with the asphalt as well as coated with it on the surface. The granules give the material its final appearance, but also protect the asphalt from the effects of sunlight and water. The finished product is a durable water repellent surface that works well on sloped and vertical surfaces. A technical development of particular importance to the siding variation was special heated embossing rollers. These rollers allowed a pattern to be impressed into the granular surface. The textured brick surface and the scored lines of "mortar" joints were all made possible by this technology.

History of Asphalt Siding

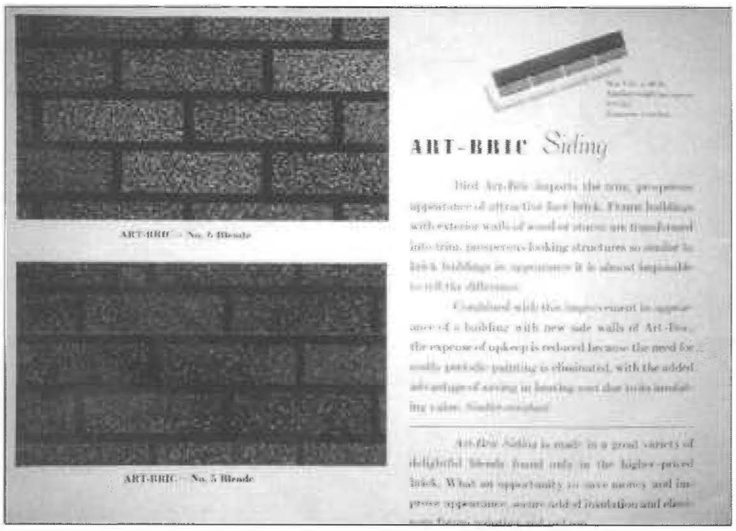
Asphalt roofing shingles and rolled roofing products could be used for sidewall applications as well as sloped roof surfaces from the beginning of their production. The sidewalls of dormers or equipment penthouses are early and typical examples of these uses. However, the development of granule-coated asphalt felts for wall surfaces did not become a common treatment until the 1930s. These products were largely marketed as a renovation material, meant to cover wooden surfaces that needed painting. The origins of the material in the 1930s took place when a decline in building left the roofing industry with far more capacity than was needed, and asphalt siding was an overall attempt to expand the product lines of the manufacturers into the existing building market. It was an extremely successful decision.

In 1929, the first asphalt shingle specifically made for walls was produced.[1] In 1931, both the Johns-Manville Company and the Certain-teed Products Company offered a strip shingle simulating brick.[2] These were little different than the common multi-tab shingle, but were produced with a 2-1/2 inch exposure and 9-1/2 inch length that simulated a brick. The strip shingles were divided into individual bricks with "mortar" lines between the "bricks;" mortar colors were white, brown, or black, and "bricks" were available in red or buff colors. The early brick shingles were typically not textured, but used the variations in the granule mix to produce the effect of masonry. By making the exposed shingle color the body color and the lapped shingle area the mortar color, the appropriate contrast and depth between bricks and mortar joints could be simulated. The major disadvantage of this system was the extensive labor required for installation. Larger units, such as those produced for asbestos wall tile, made these products cheaper to install. The brick shingles were marketed primarily in the 1930s, but were ultimately replaced by larger-scale pieces that reduced the labor cost of installation. While brick patterned siding predominated, there were considerable variations - with rectangular, hexagonal and pyramidal shaped wall shingles as well. The wall shingles were also manufactured for more color variation than was typically found for the brick patterns. Green, tan, and blended colors were all popular. These types of variations were also being produced for roofing shingles. In 1938, the Barber Genesco Company offered "four-point strip siding," which came in 11 inch by 36 inch units with a diamond pattern. In virtually

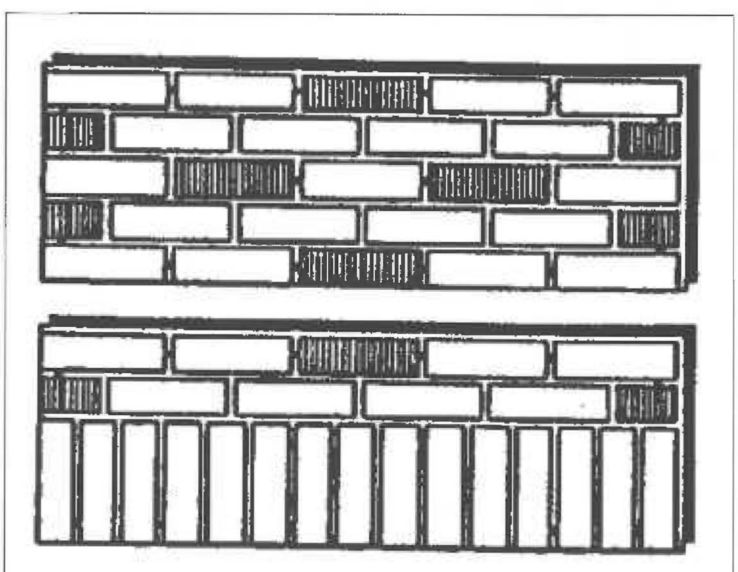
all cases, the wall shingles were offered in strip form with multiple tabs so the overall scale of the material was reduced.

The proper installation of wall shingles required a smooth nailable surface, as the pliable shingles could not be installed directly on clapboards or other irregular surfaces. Another new product, pressed cellulose sheathing (also known as fiberboard or the brand name of Celotex), was developed and marketed at the same time. Place over clapboards, this material also provided some additional thermal insulation, another marketing claim for the installers. The use of this sheathing often resulted in the removal of projecting mouldings or details that would otherwise have interfered with the smooth surface needed for the shingles.

In 1935, Bird & Sons offered a product called Insulated Brick Siding, in which panels of mineral-surfaced asphalt "brick" were attached to half-inch thick cellulose backing. Individual pieces were 12 inches wide by 8-1/2 feet long and weighted 194 pounds per square. Production of the simulated brick pattern on large sizes

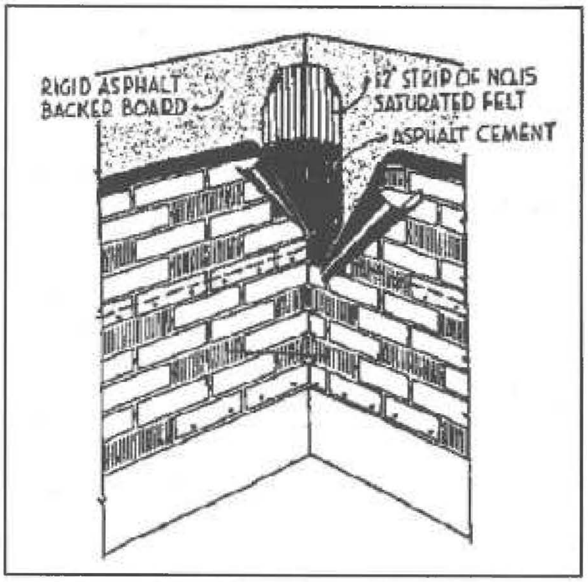


Bird & Sons was one of the industry leaders in the production of asphalt siding. Two different types are shown here, the individual shingles and the insulated panels. Red and tan brick were the dominant patterns in the 1930s and 1940s. Bird & Sons, Inc. 1935.



Insulated siding with brick pattern. Source: Herbert Abraham, Asphalts and Allied Substances, 1963.

Rolled asphalt/brick siding came with a variety of accessory pieces for the corners and edges of the building. Sears Roebuck & Co., 1959. (Photo courtesy of author)



Inside corner installation of rolled asphalt siding. Source: Asphalt Roofing Industry Bureau, <u>Manufacture, Selection and Application of Asphalt Roofing and Siding Products</u>, 1964.

became possible with the technological advances in the manufacture of rolled roofing, which allowed heated rollers to press detailed patterns into the granulated surfaces. Initially, Bird & Sons offered the rolled brick siding material only in the form of insulated sheets, but ultimately this product would be available in rolled form as well, from Bird and many other manufacturers.

In 1941, the Philip Carey Company was marketing "Carey Roll Brick Siding," in 15-3/8 inch (five bricks) by 43 foot sheets. The colors were red and buff, with a pattern that included plain brick and randomly placed vertically textured brick. This product and others like it enjoyed great popularity during the 1940s. Sears Roebuck & Company marketed this product as "Homart Asphalt Roll Siding." The rolled brick was complimented by a series of accessory strips for inside and outside corners, edge trim and "soldier courses."

The next development in the insulated siding area was that of expanding patterns. By 1950, Sears was offering the "Roll-Type Asphalt Siding" in brick or stone designs. In 1951, the Flintkote Company offered insulated siding panels in four different patterns - shingle, ashlar stone, shakes and brick. Panels were 14 inches by 43 feet and weighed 155 pounds per square. By the late 1950s, Sears was marketing insulated siding panels in a dozen different colors and textures with variations in wood grain, striated, stone and brick. The typical colors expanded during the 1950s with gray, mint green and even pink blend being popular.

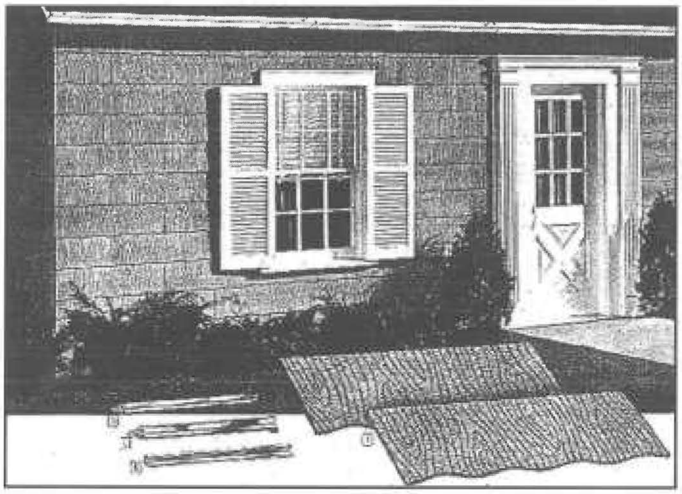
The 1950s also saw the use of asphalt siding in new construction in the post-World War II housing expansion. Asphalt siding panels were sometimes used for the rear and side walls with the front of the house in brick or stone. The panels were still used in the renovation market, with the insulated panels showing increased popularity over the rolled or shingled types.

The use of asphalt siding declined greatly during the 1960s as the popularity of aluminum and steel siding that imitated wood clapboards took over the market for residential remodeling materials. By the 1970s, rolled asphalt siding virtually had ceased production. Rolled roofing products continued to be available in plain sheets, but these were not marketed, or deemed very appropriate, for sidewall installations.

Asphalt siding deterioration and repair

Asphalt siding suffers from the same general deterioration processes as asphalt roofing shingles. Over time, the asphalt matrix looses some of its "pliability," granules are loosened from the surface and joints are particularly susceptible to infiltration. The siding can also sag and buckle. This is particularly a problem for siding that was not affixed to rigid insulation boards. The long-term effect of thermal expansion and contraction causes the nail holes to get larger, which in turn allows the siding to buckle or slip. Dislocated siding exposes the fiberboard backing to increased water penetration. This is a major problem as the backing board is highly susceptible to water damage, which further dislocates the surfacing. Any overall building movement or settlement will also result in exposed joints.

Once a piece of rolled siding is deformed, it can be reattached and will flatten out, but some visual effect will remain and the flattening process can crack the substrate. When repairing asphalt siding, new zinc-coated roofing nails with wide heads should be used in conjunction with roofing mastic to reseal loose pieces and joints. Clear sealants can also be used at joints with minimal visual affect. There are no recommended coatings from the asphalt roofing industry that are currently used to prolong the



Textured shingles with "wood" and other patterns were popular in the 1940s and 1950s in both insulated and uninsulated versions. Source: Montgomery Ward Catalogue, *1946-1947.*

life of asphalt materials. Ordinary maintenance procedures can and will prolong the life of the wall system.

Asphalt Siding Replacement
Anyone attempting to purchase asphalt siding with textures and patterns duplicating brick or stone will find that this material has been out of production since the 1970s. If a small quantity is needed for repairs, the first place to check is the building itself. Are there any secondary locations from which pieces can be "borrowed"? This is often sufficient for small repairs. The following suggestions are offered to help anyone needing to reproduce a larger quantity of asphalt siding:

Alternative 1: Salvaged materials. Architectural salvage depots have become a popular source of supply for woodwork and various elements of building trim, but maybe the time has come when typical exterior siding materials that are obsolete need to be considered for salvage. Another possibility is for salvage to be scouted from another building that is being renovated. In the case of asphalt siding, it is frequently removed from buildings during renovations, which could be a source for other building projects. A local siding company should be contacted, as they are frequently working on houses with these materials.

Alternative 2: Paint lines on the surface of rolled roofing. For example, red rolled roofing could be used to easily replicate red brick, with a white or black mortar pattern painted on the surface. Unfortunately, modern rolled roofing may not be available in the matching color. Painting the siding itself is a possibility, but one that runs counter to the nature of the original material.

Alternative 3: Score lines on the material by removing the surface granules. If the lines of the original material were black (such as black ashlar stone lines on white surface) it is possible to scrape away the surface granules and expose the black asphalt base. The resulting product may not last as long as the original, but will give a passing duplication, with enough care in the labor.

Insulated asphalt siding: The cellulose insulated board that was originally used for insulated asphalt siding is still available today. The two alternative techniques outlined above could be used and then adhered to a cellulose backing board. Simple carpentry tools could then be used to create the size and rabbeted edges.

Conclusion
Asphalt siding, with its fairly narrow time line, can be used like an architectural datum line of the mid-twentieth century. It began in the 1930s, flourished in the 1940s and 1950s, and died out in the 1960s. Each decade seems to have had its most popular material, be it the tan brick asphalt siding of the 1940s or the gray stone and textured shingles of the 1950s. This brief chronology makes it possible to use asphalt siding in the dating of changes to a structure, which can be very useful in many renovation projects. Traditionally, the preservation community has regarded these materials as inappropriate

This two-story frame house was covered with rolled asphalt siding in imitation of stone, a material that was popular in the 1950s.

coverings over the historic materials that were original to the buildings. However, it is only a matter of time before these materials are determined to be part of the time period of history that we wish to preserve.[3]

Most asphalt siding is not likely to survive as a exterior finish. The current demise of the siding stems from both the physical failure of the material and its association of with an inferior building technology. Like many imitation materials, it will always have to prove itself as a second cousin to the original. Very rarely has the imitation material risen in status to the point that it is regarded as having equal value (economic or aesthetic) to the original. A similar case can be made for wood graining, where a new respect has emerged for the fine craft of painting wood to imitate other woods. Physically, the asphalt matrix that holds the surface granules in place will eventually fail but its exact life span is still unknown. Some fifty-year old installations are still in excellent condition. When installed in protected locations, such as under wide eaves on northern exposures, the material could easily survive for a century with little maintenance, which makes it an extremely durable building material. The wood substrate underneath the siding may fail before the asphalt matrix does. Fashion rather than function is the more likely reason for the removal of this material.

Preservationists may be faced with trying to evaluate the status and treatment of buildings with asphalt siding that contribute to an historic district. Some recommendations may help this decision-making process. First and foremost, know the date of installation relative to the time period of significance for the historic district. Was the siding installation done within this time period or later? Obviously, the older the material, the more likely it is to be historic. The earliest materials were the brick and patterned shingles, which tend to predate World War II. Second, what is the overall condition of the siding? Surfaces with excellent integrity deserve more preservation consideration that those that are substantially deteriorated. Third, was the material installed so that only the clapboard surface was covered but all edge trim and windows casings were left exposed? If so, the overall form and characteristics of the original building can be very well understood, even if the primary surface is altered. If all of these characteristics are present the structure and its siding should qualify as a building and features contributing to the historic district.

The textured beauty of asphalt siding, particularly the patterned variations other than imitation brick, is worthy of a new respect. When the material is not trying to imitate, but is used to articulate, the effect can be quite handsome, particularly when it is used in contrast to existing trim. The delicate mottled appearance that comes from a mix of many colored granules is a distinctive quality of this material, and should be admired, just as we would a fine ceramic. The use of textured shingle surfaces has a long tradition in American domestic architecture, particularly in the late nineteenth-century Queen Anne Style buildings. At best, asphalt siding can have an equal quality to these patterned surfaces, which enjoy considerable popularity. Asphalt siding is particularly suited to curved surfaces, which have once again returned to American domestic architecture. Is it possible that asphalt siding shingles, with their qualities of texture, pattern, and curvability, will once again be revived as an exterior building material?

Notes

[1] Benard Sachs, "Looking Backwards: The Birth and Growth of a Great Industry are Reflected in

the Pages of American Roofer" *American Roofer* (January 1940): 12.

[2] *Sweet's Catalogue*, 1931. This and all notes about the style and availability of siding products are taken from trade catalogue literature, particularly the *Sweet's Catalogue* file and annual catalogues of Sears, Roebuck, and Company.

[3] In the course of researching this paper, the author was contacted by a church group restoring a 1941 structure that was originally covered by insulated asphalt siding. They were trying to determine an appropriate strategy for its preservation. The author was also contacted by a home owner whose house had asphalt siding on the interior light well, and who was seeking advice on how to repair it for the most pragmatic and economic reasons.

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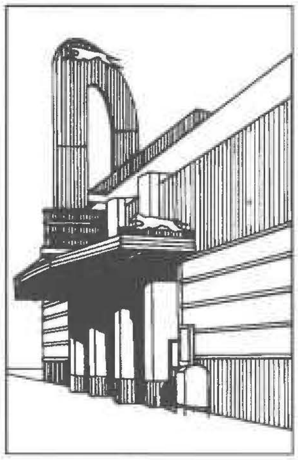
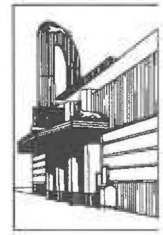


The Curtain Wall



Curtain Wall Development: The Loss of Redundancy

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Central to the development of Modern architecture was the concept of the curtain wall, which opened new opportunities for architectural expression in tall building construction. From wall construction that consisted of thick, heavy masonry to contemporary metal and glass materials, curtain wall components changed dramatically. The change in curtain wall construction resulted in shifting the functional burden onto thinner and different materials, with the result being a loss of redundancy.

For aesthetic and functional reasons, typical curtain wall construction from the late nineteenth century to World War II was composed of heavy walls of brick, stone, and terra cotta. Following the War, a curtain wall with lighter weight materials and thinner cladding systems was quickly adopted. Instead of relying on multiple layers of masonry to maintain weathertightness, the curtain wall now relied on thin veneers of glass, metal, and stone to protect the interior from the elements.

With any preservation work, material conservation is a central issue. This paper and those to follow will examine the historic development of the curtain wall, the materials used its construction, and preservation of those materials. This introduction will focus on the effect of historic changes in curtain wall construction on the performance of the curtain wall. As the exterior wall became thinner, different types of distress and mechanisms of failure occurred in the cladding materials and systems.

What Is A Curtain Wall?

As defined in the first half of this century, a curtain wall is "an enclosing wall built and supported between columns or piers, and on girders or other support, and sustaining no weight other than its own."[1] Spanning between support points at floor levels, its primary functions are to provide weathertightness, provide a fire wall, and transfer laterally-induced loads to the structural frame. The curtain wall does not have the limitations of a bearing wall. More wall area can be opened up for glazing. The forms of the wall can vary depending on the architectural requirements. By eliminating the requirement for the exterior wall to carry gravity loads, materials not normally used in a bearing capacity (such as glass) and twentieth-century materials (such as aluminum) can be used in place of masonry.

The early curtain walls used the traditional materials and methods of building: stone, terra cotta and brick. The wall consisted of multiple wythes of masonry which used mass to resist wind loads; masonry (primarily clay tile) was also used for the fireproofing of the structural steel frame.

Although several early examples were proposed and a handful constructed, wide use of glass and

metal curtain walls did not occur until after 1945. The use of metal and glass as the primary materials was the most dramatic development of curtain wall construction. With this type of construction, the fireproofing of the structural frame was first provided by masonry; the masonry fireproofing was circumvented by the 1960s by spray-on fireproofing.

The development of new materials occurred in the post-war years: thin stone veneer, aluminum, precast concrete, brick veneers, and the descendants of the metal and glass curtain wall such as structural silicone glazed facades. To bring things full circle, the aesthetic development of "Post-Modernism" led to a return to earlier architectonic forms, but not a return to earlier methods of construction.

The Differing Distress Mechanisms Associated with Curtain Walls

Different methods of curtain wall construction involve different mechanisms of distress as discussed below.

Masonry curtain wall construction consists of facing material backed by several wythes of brick or clay tile, for a total wall thickness of as much as twelve inches or more. Figure 1 shows examples of a terra cotta curtain wall as it was detailed in a 1927 guidebook for architects and engineers. Metal shelf angles to support the masonry infill are anchored to the structure at the floor levels. Flashing was not commonly used and corrosion of the shelf angles and other metal embedments is a significant cause of distress in masonry curtain walls. The detrimental effects of placing metal within masonry was described by Viollet-le-Duc in 1877, in writings well known to American architects of the period, where he stated "...this kind of material will destroy that; iron let into stone-work oxidizes, decomposes, and bursts the stone."[2]

Another issue was the differential movement of the curtain wall relative to the structural frame. As stated by Viollet-le-Duc:

> If, therefore, we undertake to encase an iron structure with a shell of masonry, that shell must be regarded only as an envelope, having no function other than supporting itself, without lending any support to the iron, or receiving any from it. Whenever an attempt has been made to mingle the two systems, mischief has resulted in the shape of dislocations and unequal settlements.[3]

By 1894, lateral movement in curtain wall construction was actually being studied and analyzed. For example, lateral movements of steel-framed buildings in Chicago, including the seventeen-story Monadnock Building and the fourteen-story Pontiac Building, were documented under high wind loads.[4]

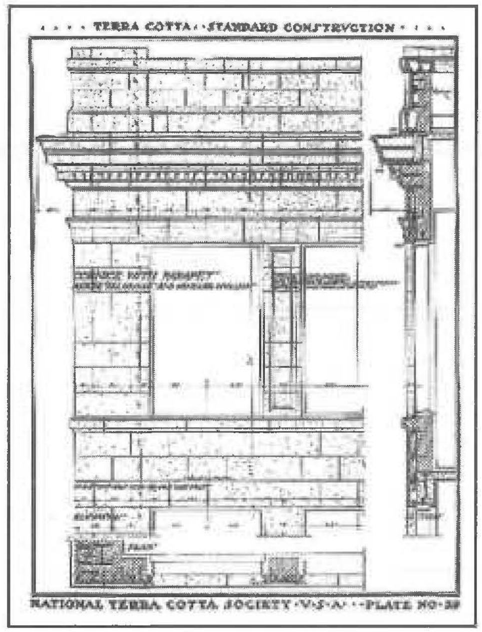


Figure 1. The use of a terra cotta and backup masonry curtain wall is shown in Plate No. 29 from Terra Cotta: Standard Construction published by the National Terra Cotta Society in 1927. The metal anchorage that is a critical part of a terra cotta curtain wall is shown on the drawing.

The exterior cladding is exposed to temperature changes and consequent temperature-related movements, while the embedded frame is protected. Structural frames shorten under dead load and material creep. Conversely, masonry curtain walls expand due to the intake of moisture. Early curtain walls were not built to accommodate these differential movements resulting in the introduction of unanticipated stresses into the curtain wall and frame. Figure 2 shows an example of a structure that has experienced this type of distress. This problem came to be understood as evidenced by displacement measurements that were performed during construction of the Empire State Building in 1931:

> The horizontal deflection of the top of the Empire State Building was monitored by the American Institute of Steel Construction. Measurements were also made to determine exactly how much lower the various floors are than their theoretical position. These

measurements showed that the 85th floor was 6 1/4 in. below its theoretical elevation during construction.[5]

An example of distress from this displacement includes the bowing of the face masonry between shelf angles. To address this differential movement, a lead pressure-relieving joint ("cowing") was developed by the 1930s. Cowing was typically laid horizontally at mid-span in every story of the highrise masonry facade. This form of pressure relief was utilized in masonry envelopes until the 1960s. This type of joint has been superseded by soft joints beneath masonry shelf angles, as commonly used in construction today.

Besides serving the function of transmitting wind loads to the structural frame, the curtain wall also must resist moisture infiltration. To enter the interior, the moisture must pass through the mass of the wall; it may take a relatively long period of time for the moisture to become apparent on the interior. The mass of the wall may become saturated with slowly developing detrimental results. Another issue with construction of this type is the lack of a vapor barrier. Moisture that condenses in the wall in cold weather may contribute to corrosion of the anchorage of the curtain wall; an example is shown in Figure 3.

Figure 2. Interaction between the curtain wall and structural frame can lead to distress. This typical Lake Shore Drive apartment building in Chicago, Illinois, shown under construction in the 1920s, has experienced distress of the brick curtain wall from shortening of the concrete frame due to creep. Frank A. Randall, History of the Development of Building Construction in Chicago (Urbana, Illinois: The University of Illinois Press, 1949), 267.

Glass and metal curtain wall construction consists of factory-fabricated and preassembled metal units that are connected to the structural frame. These assemblies may be factory or field glazed. The assemblies may also include panels of aluminum, ceramics, precast concrete, or stone. An early glass curtain wall is shown in Figure 4. While these curtain walls are designed to be as weathertight as possible, an interior flashing system is provided to direct water that leaks through the cladding back to the exterior.

Lateral movements of the frame and differential movement between the frame and the cladding can lead to distress in the glass and metal curtain wall. Modern structural frames are more flexible and are more exposed to temperature extremes than the frames of a masonry-clad building. Prefabricated curtain wall units must be detailed to accommodate these increased movements.

High-tech materials that have been adopted for use on these curtain walls offer unique maintenance challenges. Tempered glass may fail due to nickel-sulfide inclusions. Thin-stone veneers may become distressed from material weakness, loss of strength due to hysteresis, or deterioration due to anchorage. Incompatible materials such as certain sealants and building stone or dissimilar metals can cause staining which can pose long-term maintenance problems.

Composite materials such as 1/8 inch thick stone adhered to a honey-comb core of metal, or ceramic and terra cotta married to glass fiber reinforced concrete have been used on a limited basis. High performance sealants are presently being used which hold glass panels in place and eliminate the metal grid from the building exterior. Some of these developments have been only partially successful and the long-term durability of these relatively new products is not well known. These new and specialized systems will present special preservation issues in the future.

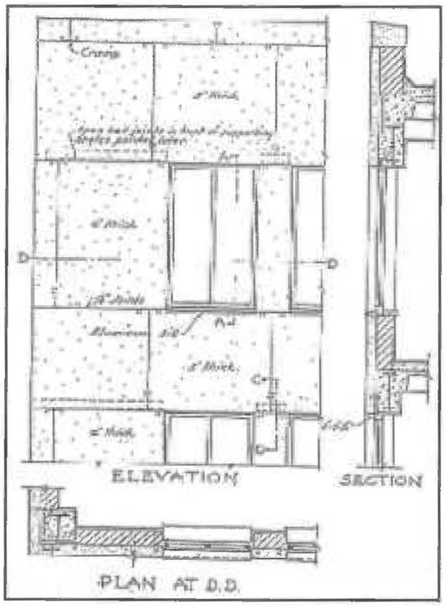


Figure 3. Limestone curtain walls were prevalent from the 1920s through the 1940s. The thickness of the limestone is noted as five to six inches, whereas postwar thin stone applications were less than 1-1/2 inches. Corrosion of the shelf angles and embedded metal anchors leads to distress of the masonry. Charles George Ramsey and Harold Reeve Sleeper, Architectural Graphic Standards (New York, New York, New York: John Wiley & Sons, 1941), 40.

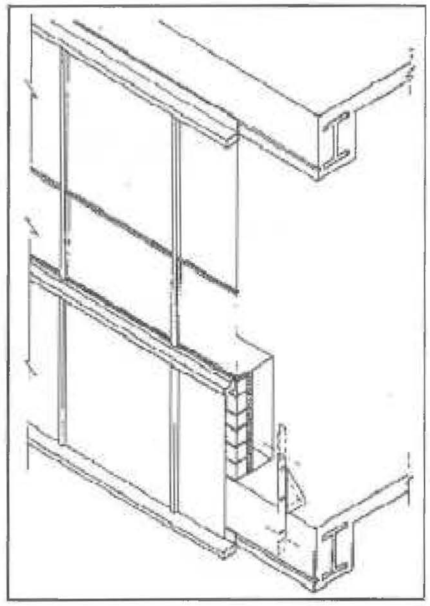


Figure 4. An axonometric drawing of an early metal and glass curtain wall, where the thinness of the construction is striking in comparison with the masonry curtain wall. As shown, masonry continued to be used as backup at the spandrel in early curtain wall buildings. William Dudley Hunt, Jr., The Contemporary Curtain Wall: Its Design, Fabrication, and Erection (New York, New York: F. W. Dodge Corporation, 1958), 4.

The Concept of Redundancy

In a general sense, redundancy in design can prevent failures of a building system. Structural redundancy, referred to as "belt and suspenders," allows for loads to follow an alternate path if the primary supports fail. Redundancy of design for curtain walls can apply not only to structural issues but to performance issues such as weathertightness as well.

The mass of the masonry curtain wall provided an extremely redundant system. While lack of maintenance could lead to water infiltration problems or deterioration of the cladding system, these problems did not usually become apparent immediately but manifested themselves only over a long period of time.

In the post-World War II metal-and-glass curtain wall, a system of redundancy was introduced that involved making all joints as weathertight as possible, with the assumption that joints would eventually leak, while providing positive means for conducting the moisture out of the wall.[6] This was an engineered redundancy, not universally accepted, and did not provide the inherent multiple redundancy that was provided by the massive masonry curtain wall. A breakdown of these protective systems in the metal-and-glass curtain wall would lead to immediate water leakage on the interior.

Due to the engineered redundant systems that were introduced, and the generally reduced redundancy, modern glass-and-metal curtain wall systems experience complex problems that were not historically of concern. Water leakage problems from failure of sealants or improper design are more significant in buildings constructed with these "less forgiving" curtain walls. Water penetration in small amounts, a condition which may be of little consequence in a building enveloped in massive walls of masonry, becomes immediately apparent and detrimental to interior finishes in a modern curtain wall-clad structure. Issues of stone strength and panel anchorage were of less concern in the masonry curtain wall. The

complexity of the cladding panels or systems themselves, involving several types of materials, is a result of twentieth-century Modern architecture.

The maintenance of masonry, metal and glass, or other curtain wall systems presents a variety of preservation issues. As our post-World War II buildings become historic landmarks, the problems that we face will become more complex. Just as the installation of flashing systems into masonry curtain walls adds a level of redundancy, the metal and glass curtain wall and its descendants may require the addition of redundant systems to maintain their performance. These systems may be difficult to incorporate without adversely affecting the original aesthetic of the curtain wall.

Notes

[1] Frank E. Kidder and Harry Parker, editors, *Kidder-Parker Architects' and Builders' Handbook* (New York, New York, New York: John Wiley & Sons, 1950), 2246.

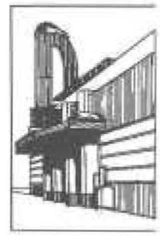
[2] Eugene-Emmanuel Viollet-le-Duc, *Lectures on Architecture,* Volume II (New York, New York: Dover Publications, Inc., 1987; first published in 1877), Lecture 11, 2.

[3] Ibid., Lecture 13, 129.

[4] Tests performed by Mr. W.L. Stebbings, CE, of Chicago. *Engineering News,* March 1, 1894.

[5] H.G. Balcom, "New York's Tallest Sky-scraper," *Civil Engineering* 1, no. 6 (March 1931), 471.

[6] At first caulking compounds, ubiquitous in today's curtain wall construction, were not recommended for sealing joints. They held little promise because they "fail due to expansion/contraction and will require constant maintenance." John Hancock Callender, "The Design of Metal Curtain Walls," *Metal Curtain Walls: Proceedings* (Washington, DC: Building Research Institute, 1955), 79-97.



The History of the Curtain Wall: From Craftsmanship to the Machine-Made

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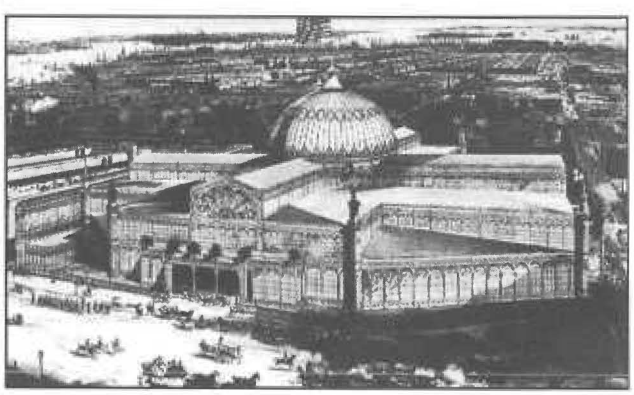
The curtain wall dichotomy can be traced back to numerous nineteenth and early twentieth antecedents, including glass exhibition pavilions, cast-iron fronts, and masonry infilled metal frame structures. In the United States curtain wall development became intertwined with that of the skyscraper. Skyscrapers would not have been technically feasible without the lightweight curtain wall. And it was through the skyscraper that the curtain wall achieved its greatest realization.

The development of the curtain wall was governed by numerous factors. Its technology was dependent upon the introduction of the metal skeleton frame, and the development of lighter materials, in conjunction with adequate fireproofing systems. Economy dictated that the amount and weights of materials used be minimized, that fabrication occur in the factory rather than the site, and that construction become standardized. Aesthetics called for ever greater expanses of glass, and reflected the technological and economic developments. The changing aesthetics also illustrate the evolution from the craftsmanship of hand-made masonry materials to the sleek glass and aluminum skin that cloaks a highrise building frame: a machine aesthetic which has come to dominate post-World War II skyscrapers.

Antecedents of the Curtain Wall

London's Great Exhibition building of 1851, the Crystal Palace, is identified by Pevsner as the "touchstone" of those technical achievements that point forward to our own era. The Crystal Palace had precedents in smaller, earlier structures, and set a precedent for later nineteenth century exhibition buildings. It was an example on a very large scale of the aesthetic of a transparent skin encasing a wholly-visible iron frame. It was also an early illustration of the use of mass-production, and was designed in standard parts - sections of cast iron and glass based on a modular unit[1]. Only by means of prefabrication and the use of construction techniques using dry



New York's Crystal Palace (Cartensen and Gildemeister, 1853), patterned closely after its predecessor in London, was another impressive demonstration in the use of iron construction cloaked in a skin of glass. The pavilion dramatically illustrated a technical difficulty with these early glass curtain walls. The structure was not fireproof, and on 5 October 1858, in less than one hour, it burned to the ground. Robin Fleming, "Whence the Skyscraper?" Civil Engineering 4, no. 10 (October 1934)

materials (glass and metal) rather than wet materials (masonry) could a building of such a size be erected in the short time of four months.[2]

The Crystal Palace also exhibited the future trends in construction in which operations performed on site would be transferred to the factory,[3] and in manufacturing which the machine would supplant hand craftsmanship.[4] The Crystal Palace and later glass-walled exhibition buildings of the nineteenth century were never built to last, and the glass curtain wall aesthetic that was employed did not make its way into mainstream architecture until the middle of the twentieth century.

By the mid-nineteenth century, cast-iron architecture was in widespread use in the urban centers of the United States. Since slender iron columns could support an entire facade, larger windows were made possible than in traditional masonry. Columns and lintels became a narrow grid for the support of windows that dominated the facade. Though these facades were not technically curtain walls, the aesthetic of a glass facade had been realized. In addition, the cast-iron front was economically advantageous, and merchants responded to the speed and economy with which these buildings could be constructed. The parts of an iron facade were fabricated and tested for fit at the foundry, and then the prefabricated parts were assembled at the site.[5]

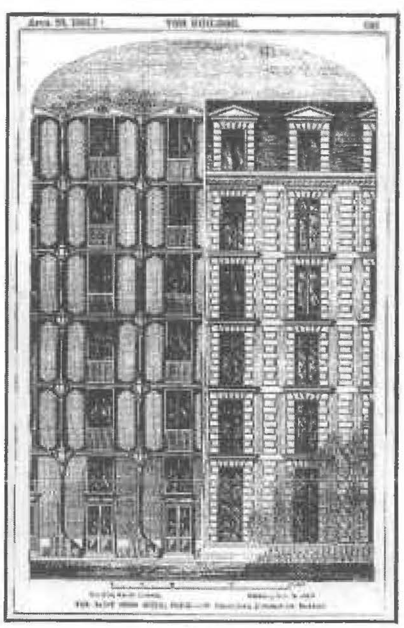
Perhaps the most significant development by a cast-iron front manufacturer was not the iron front but the McCullough Shot Tower (1855) erected in New York City. Constructed by James Bogardus, the tower was 175 feet high and was supported by an octagonal cast-iron frame. The frame was visible from the exterior and was infilled with brick.[6]

In 1865, George H. Johnson, another cast-iron front manufacturer, constructed two five-story "fireproof" grain elevators, one in Brooklyn and the other in Philadelphia. The exterior walls of these buildings "consisted of a framework of cast-iron uprights, in the form of pilasters with horizontal cornice members, all bolted together, forming panels of about 15 by 15 feet, which were filed in with twelve-inch brick walls."[7] Johnson's grain elevators and Bogardus' shot tower shared a masonry curtain wall construction that would be further developed in Chicago in conjunction with the development of the skyscraper.

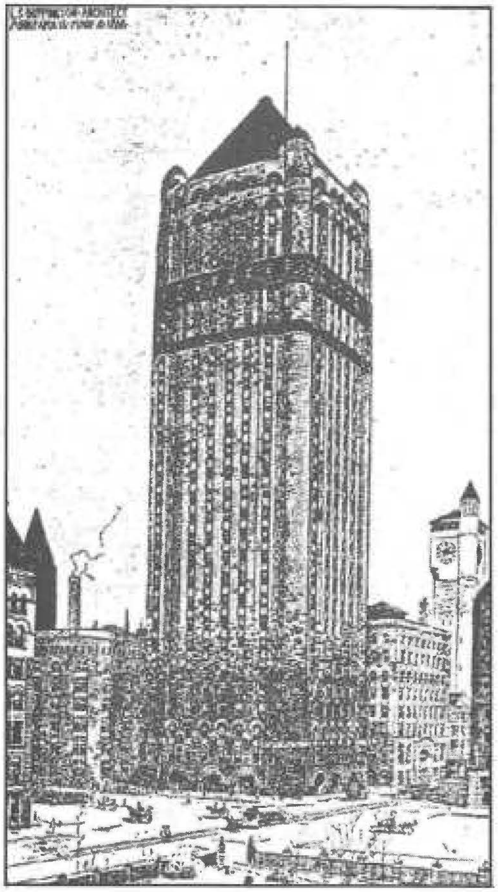
The Masonry Curtain Wall and the American Skyscraper

The late nineteenth century was an inventive era in American construction. The metallurgical industries, accelerated by the demands of the Civil War, were able to supply structural metals in quantity for construction. Clay tile that could be used to fireproof the new metal skeletons was developed. Production of glass became industrialized, and larger sizes of glass were made possible.[8]

Chicago architect William LeBaron Jenney was an innovator of the application of the iron frame and masonry curtain wall to the high office building. The Home Insurance Building (1884-1885) exhibited the essentials of the fully-developed skyscraper on its main facades with a masonry curtain wall.[9] Spandrel beams sup-



The warehouse of the St. Ouen Docks in Paris was erected between 1864 and 1865 after the plans of Préfontaine and Fontaine. Its construction closely mirrored the work of Bogardus and Johnson in the United States during the same period. As described at the time; "All the interior facade, and the east and west exterior fronts...are entirely composed of cast-iron and brickwork, the iron framework forming a series of six columns superposed, united together by cast-iron arches...The partitions are of hollow bricks...laid on the flat...." <u>The Builder</u> *(29 April 1865).*



In 1884 LeRoy Buffington, a Minneapolis architect, designed an unrealized 28-story building which was, as he wrote "composed of a braced skeleton of steel with [masonry] veneer supported on shelves fastened to the skeleton at each story." Buffington's prophetic "cloudscraper" design exhibited a clear concept of a fully developed curtain wall and its importance in tall building construction that was lacking in Jenney's design. The building was never constructed. Buffington claimed that he had put his ideas for the "cloudscraper" on paper before Jenney's Home Insurance Building was designed, and he actually instituted infringement suits from the owners of all skyscrapers in Chicago. The skyscraper evolution after 1890 was so swift that Buffington's work was forgotten. E. M. Upjohn, "Buffington and the Skyscraper," The Art Bulletin 17, no. 1 (March 1935).

ported the exterior walls at the fourth, sixth, ninth, and above the tenth levels. These loads were transferred to stone pier footings via the metal frame without load-bearing masonry walls.[10] Frederick Baumann, a noted Chicago structural engineer of the period, clearly described the potential of the masonry curtain wall for tall buildings.[11]

Jenney trained many of the architects who designed Chicago's early skyscrapers including Louis Sullivan, William Holabird, Martin Roche, and Daniel Burnham. The masonry curtain wall technique was fully developed within a few years by these architects, and was utilized in a functional aesthetic that came to be known as the Chicago School of Architecture. These architects were well aware of the contributions of Bogardus and Johnson.[12]

An archetype of the Chicago School can be found in the rigid frame Reliance Building (D.H. Burnham, 1895), the first skyscraper to use terra cotta exclusively as a cladding. The Reliance Building curtain wall is a clear aesthetic expression of the underlying structure and provides a maximum of natural lighting. The terra cotta units of the curtain wall are connected to a gridwork of cast-iron mullions, lintels, and sills which span between levels. Unlike the Home Insurance Building and other similar buildings, the Reliance Building did not rely upon the masonry curtain for lateral support.

In New York City the rigid steel frame and masonry curtain wall established themselves with the American Surety Building (Bruce Price, 1894), and, once adopted, skyscraper heights increased dramatically. The once impressive twenty-story buildings of Chicago were overshadowed by buildings 300, 600, and finally 792 feet with the Woolworth Building (Cass Gilbert, 1913). The Woolworth Building utilized the latest developments in steel frame construction, but its masonry curtain wall, which incorporated Gothic references, had not abandoned the handcrafted ethic of masonry construction and ornament.

Early Experiments with the Glass Curtain Wall

By the end of the century, European architects were exploring the aesthetic possibilities of glass and metal on building facades. An example is Victor Horta's design for the auditorium in the Maison du Peuple (Brussels, 1896, demolished), where the iron frame was enclosed only by glass or thin panels held in iron frames.[13] Another example was Bernhard Sehring's Tietz Department Store (Berlin, 1898, demolished), which featured three bays, each framed in stone baroque detailing. The remaining facade was glass with thin iron mullions and muntins.[14]

Similar themes were explored in the United States at the beginning of the next century. The Boley Building (Kansas City, 1909) by Louis Curtis, incorporated a transparent glass wall enclosing an entire structure. These experiments in the aesthetic possibilities of the glass curtain wall were largely ignored by American architects of the period.[15]

The European Modern Movement and the Curtain Wall

Prior to the First World War, German architects addressed the development of a modern aesthetic for the glass curtain wall. The Allgemeine Electrizitats-Gesellschaft Turbine Factory (Berlin, 1909) designed by Peter Behrens used large glass screen walls that conveyed the power of industry, while the rusticated masonry pylons and gabled front linked it with the medieval building traditions acceptable to the barons of industry. This transitional building bridged the gap between conservative and progressive elements in architecture.[16]

Behrens' influence in the European architectural community is apparent in the make-up of his office which included during various periods Walter Gropius, Adolph Meyer, Ludwig Mies Van der Rohe, and Le Corbusier.[17] Upon leaving Behrens' office, Gropius and Meyer were commissioned to build the Faguswerke Factory (Alfeld-an-der-Leine, 1911), regarded as one of the founding monuments of European modernism. At this factory, each level is indicated by solid spandrel panels that are installed like the glass above and below them, a treatment echoed by post-World War II highrise curtain walls.[18]

The First World War administered the final blow to the arts and crafts movement in Europe, and the machine became the basis of the new architecture. Modern European architecture required that the labor of producing the parts be performed in the factory rather than by skilled craftsmen on site.[19] German intellectuals were in awe of the example of the American skyscraper, a strong symbol of the new world for which they endeavored.[20]

An early glass curtain wall appeared at the Hallidie Building (San Francisco, 1918). In this building, Willis Polk, an associate of Chicago architect D. H. Burnham, produced an entire glass facade supported from cantilevered floors with no exterior columns.

In keeping with the Russian Revolution, the period between 1920 and 1928 witnessed the growth of a movement in Soviet architecture that conflicted with traditional concepts. Soviet architects of the period stressed the primacy of structure and materials, and were attracted to large glass curtain walls. Ilya Golosov in the Zuyev Worker's Club (Moscow, 1927) was one of the many Soviet architects who utilized large expanses of glazed metal grids on their facades. After this period there was a change back to traditional methods and styles, due to the rise of Stalin's regime and the inability of the building industry to meet established technical standards.

Mies van der Rohe prepared a series of unrealized projects, of which the most famous came to be known as the "Glass Skyscraper," a highrise enveloped totally in glass.[21] The theme of the curtain wall apparent in the Faguswerke Factory and Mies van der Rohe's glass skyscraper projects was furthered by the construction of the Bauhaus (Dessau, 1925) designed by Gropius.[22] These themes were repeated in other European countries, and in Russia where the progressive aesthetic took on revolutionary overtones.

The "International Style" in the United States
Contemporary with the European modernists, America had entered a second skyscraper era. The post-World War I period brought a demand for increased speed in design and erection. Curtain wall construction, however, continued to utilize the masonry panel and metal frame techniques that had been developed by the turn-of-the-century.[23] Though mass production and standardization had begun to impact the details of architecture, the use of prefabrication and the module were not yet extensively used.[24]

One of the architects of the Empire State Building (New York City, 1931) wrote of the masonry curtain wall:

> Tradition has clung to the heritage of thick masonry walls. We inherited masonry walls and seem unable to outgrow our inheritance. The idea that masonry is the only form of permanent construction was so deeply rooted that practically all building codes made masonry walls mandatory ... The covering of the observation tower ... accomplished by a combination of aluminum, chrome-steel and glass, [was] designed and fabricated into forms entirely free from masonry influences. The extension of similar treatment to embrace all of the inclosing walls of a tall building is quite conceivable and, if backed with insulating materials to reduce heat loss and properly finished on the interior, will result in a light wall, readily made weathertight, easy to fabricate and erect and requiring practically no maintenance.[25]

The European Modern Movement, which was known in the United States as the "International Style," was formally introduced to American architects in 1932.[26] The style dovetailed with demands of economy, efficiency, and the elimination of decorative features on the facade.[27]

This trend was illustrated at the new headquarters for the New York Daily News (Hood and Howells, 1930), the McGraw-Hill Building (Hood and Fouilhoux, 1932), and the Philadelphia Savings Fund Society Building (Howe and Lescase, 1931). The effects of the Great Depression and the Second World War brought a halt to building in America in the late 1930s and early 1940s.

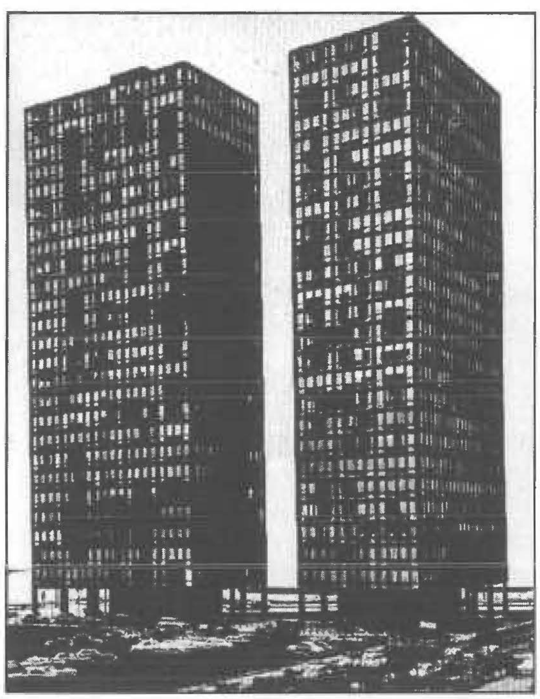
The Acceptance of the Glass Curtain Wall in America

New technologies resulting from World War II had a great influence on the acceptance of the metal and glass curtain wall and the realization of the machine-made building envelope. These technologies were achieved through improvements in materials (of which aluminum was the principal metal), innovations in glazing, glazing treatments, sealants, and insulating materials. Extruded metal components were suitable for standardization and could be prefabricated for delivery to the site. This was important because labor costs had become a significant part of construction costs. The glass and metal curtain wall further decreased building weight[28] and construction cost, and increased usable floor area. Given the abundant post-war supply, aluminum was also reasonably priced. Glass curtain wall installation was less limited by cold temperatures which prohibited erection of "wet" walls of brick and mortar. Out of this economic environment, the curtain wall had finally become almost entirely machine-made.[29]

One of the first post-war buildings to be constructed with a glass curtain wall was the Equitable Building (Pietro Belluschi, 1948) in Portland, Oregon. Belluschi was able to take advantage of leftover aluminum (stockpiled for wartime use by smelters) and to utilize assembly techniques derived from West Coast airplane plants.[30] The Equitable Building was constructed with cladding panels made from rolled sheets of aluminum, and glazing frames of extruded shapes.[31]

The 860-880 Lake Shore Drive buildings in Chicago (Mies van der Rohe, 1949-51) were among the first residential buildings in the United States to be sheathed entirely in glass, and were the realization of Mies' 1920 proposal for a glass skyscraper. The steel, aluminum, and glass skin was assembled on the buildings' roofs in two story high units, and then lowered into place on the facade.[32] During the 1950s, glass-walled buildings following this distinctive aesthetic began to appear in many American downtowns.

At the Lever House (Skidmore, Owings and Merrill, 1952), the curtain wall has an interior frame of mild steel clad with stainless steel. Its simple appearance "belies its complex internal construction which was cobbled together from off the shelf parts."[33] Similar curtain wall effects were soon made easier by catalogue components, and the curtain wall industry of the early 1950s became dominated by manufacturers and contractors who had experience with aluminum



The 860-880 Lake Shore Drive buildings in Chicago were the realization of Mies' 1920 proposal for a glass skyscraper, and set the trend for American skyscrapers through the 1950s. This project is also an illustration of the growth of needed standards within the burgeoning curtain wall industry. The curtain wall uses a mix of exposed steel and metal components, metals that galvanically react with each other. The curtain is inserted within the steel frame, and allowance for differential movement is not clearly provided. In contrast, the Esplanade Apartments next door, also designed by Mies and constructed eight years later, uses an all-aluminum curtain wall. The aluminum curtain is suspended outside the steel frame, and horizontal joints for building movement are architecturally expressed. In the interim period between the construction of these projects, curtain wall manufacturers had begun the process of codifying good practice in curtain wall fabrication and installation.

windows. At the United Nations Secretariat Building (Harrison and Abramovitz, 1950), curtain walls were conceived as an assembly of aluminum windows held in place with a grid of reinforced mullions.[34] As at the Lever House, the lower portion of the curtain wall at each level was backed up by a concrete masonry wall to provide the fire rating that code officials felt was not provided by the curtain wall.[35]

Technical guidance in the use of metal and glass curtain walls for 1950s designers was limited.[36] The ideal curtain wall was defined as being between two and five inches thick; self-insulating, able to withstand high winds; weatherproof on the outer surface; vapor-proof on the inner surface; ventilated and drained for control of internal moisture; designed for expansion and contraction of the building; easily removable for repair; sound deadening; adaptable to all types of building frames; installed from the inside without scaffolding; easy to fabricate, ship, and handle; attractive, maintenance free, and moderate in cost. Furthermore, this system was intended to last 40 to 100 years.[37] The approach to curtain wall design that quickly evolved was to make the joints as weathertight as possible, then provide positive means for conducting any water leakage out of the wall.[38] The economic impact of large lites of clear glass were also becoming apparent. The orientation of buildings in consideration of path of the sun, and the reduction in the size of windows to reduce solar heat gain were being practiced.[39]

An alternative response to the all-glass curtain wall, the Alcoa Building (Wallace K. Harrison, 1952) in Pittsburgh, used story-high panels of aluminum penetrated by relatively small windows. The windows were set in aluminum frames with rubber gaskets. Aluminum panels were formed with a pressed pattern to add rigidity, create relief, and produce scale.[40] This type of sheathing became quite popular during the mid-1960s. In the Alcoa Building perlite insulation was sprayed on aluminum lath to provide fireproofing instead of using masonry behind the wall panels.

While the machine-made potential of the glass curtain wall was being exploited, alternate cladding systems could not initially compete with the economy of glass-and-metal systems. In the face of competition, the adaptation of precast concrete, masonry, and thin stone veneers to the new curtain wall technology was comparatively slow to develop. Acceptance of these cladding systems did not come until the 1960s.

The first extensive use precast concrete for cladding was at LeHavre after the Second World War, where panels were cast on site with standardized molds to be used on an extensive network of buildings.[41] The Hilton Hotel at Denver, Colorado (I.M. Pei, 1958-1959) can be regarded as marking the beginnings of the use of precast concrete as a curtain wall cladding material in America.[42] Further examples of the development of precast concrete cladding include the Pan-American Building (1961, Walter Gropius and the Architects Collaborative) in New York, and the International Building in San Francisco (Anshen and Allen, 1959).

The development of masonry as a prefabricated cladding for curtain walls is traceable to Switzerland, France, and Denmark in the 1950s, and the United States in the early 1960s. The Brick Institute of America developed and patented a prefabricated brick masonry system which was used in construction of several building panels in the Chicago area.[43] Factory panelization techniques using latex mortar additives, however, fell into disfavor as evidenced by the reduction of companies that prefabricate masonry panels from fifteen to only a few.[44]

Exceedingly thin veneers of stone such as marble and granite appeared on high rise buildings in the 1960s. Rational rather than empirical design principles for stone were established to reduce the weight and cost of stone.[45] Stone panels became thin enough to be erected within the metal grid employed by the metal curtain wall industry.[46] Examples include the Amoco Building (Edward Durell Stone, 1973) in Chicago, and Lincoln Center (Wallace K. Harrison, Philip Johnson and Max Abramovitz, 1966) in New York City.

Future Directions of the Curtain Wall

New technologies have created the economy of using less material to cover more area, and of using new materials and installation techniques to achieve cost-effective construction. Structural silicone glazing is responsible for the large expanses of mullionless glass. Thin stone veneer applied to precast concrete panels and ceramics cast into glass fiber-reinforced concrete are just two examples of composite panels which take advantage of the permanence and appearance of the exterior material and the strength of the backup material. The rain screen curtain wall principle developed in Canada may help realize

the abolition of sealants on building skins. Latex-modified stucco panels can now be fabricated for curtain walls and are being used for highrise buildings. The polyvinylchloride (PVC) window industry is also being utilized in curtain wall technology.

A distinction of our era is the relaxation of the guidelines established by the Modernists. The use of historical styles on highrise buildings is no longer looked upon by designers with disdain; these are used more and more for "nostalgia, novelty, and innuendo."[47] Though the International Style is no longer the strict dogma of designers, the appearance and details of the curtain wall will remain forever influenced by the machine-made aesthetic with which the early Modernists were captivated.

Notes

[1] J.M. Richards, *An Introduction to Modern Architecture* (Baltimore, Maryland: Penguin Books, Inc., 1962), 66-67.

[2] Nikolaus Pevsner, *Pioneers of Modern Design* (Hammondsworth, Middlesex, England, and Baltimore, Maryland: Penguin Books, Ltd., 1974), 133.

[3] Trevor I. Williams, *A History of Technology* (Oxford: Clarendon Press, 1878), 937-938.

[4] Talbot Hamlin, editor, *Forms and Functions of Twentieth-Century Architecture*, Volume IV (New York, New York: Columbia University Press, 1952), 462.

[5] Margot Gayle, *Cast-Iron Architecture in New York*, New York (New York, New York: Dover Publications, Inc., 1974).

[6] Peter B. Wight, "Recent Fireproof Building in Chicago - Part II," *Inland Architect and News Record* 19 (March 1892): 22.

[7] Ernest V. Johnson. "Fire-proof Grain Storage Buildings," *The Brickbuilder* 11 (November 1902): 18.

[8] Marcus Whiffen and Frederick Koeper, *American Architecture 1607-1976* (Cambridge, Massachusetts: The MIT Press, 1981), 168.

[9] New York, Chicago, and Minneapolis have all claimed to be the birthplace of the skyscraper. The question of whether the skyscraper originated in New York or Chicago remains a matter of controversy to this day. Comparative characteristics include the development of the curtain wall as well as the first use of the iron frame, appearance of the beam-column moment connection, height limits, and the theory of frame stiffness.

[10] E.M. Upjohn, "Buffington and the Skyscraper," *The Art Bulletin* XVII, No. 1 (March 1935): 53.

[11] "The design is to erect on foundations a firm and rigid skeleton, or hull, of iron.... The enclosure, whether of stone, terra cotta, or brick, or any combination of these materials, may be erected at the same time the iron structure is being put in place. But the latter might proceed much faster than the former; while the hull might be roofed within two months, the enclosure might not have proceeded further than the fourth story. Thus there need be no delay to a steady progress. Light, the great desideratum in all city buildings, is secured, even on the lowest - and most valuable - floors, whereas, otherwise, the necessarily broad piers would be a hindrance. The iron uprights are to be provided with a series of projecting brackets for the purpose of anchoring and supporting the parts forming the exterior enclosure. These supporting brackets will be so arranged as to permit an independent removal of any part of the exterior lining, which may have been damaged by fire or otherwise." From "Improved Construction in Buildings," *Sanitary News* 3 (15 March 1884): page 123.

[12] P.B. Wight, "Recent Fireproof Building in Chicago," *The British Architect* (6 May 1892): 347.

[13] Henry-Russell Hitchcock, *Architecture: Nineteenth and Twentieth Centuries* (New York, New York: Penguin Books, 1982), 394.

[14] Nikolaus Pevsner, *The Sources of Modern Architecture and Design* (London: Thames and Hudson, Ltd., 1986), 96.

[15] John Burchard and Albert Bush Brown, *The Architecture of America a Social Cultural History* (Boston, Massachusetts: Little, Brown and Company, 1966) 346.

[16] Franz Schulze, *Mies van der Rohe, A Critical Biography* (Chicago, Illinois, and London: The University of Chicago Press, 1985), 36.

[17] Ibid.

[18] Hitchcock, 491.

[19] J.M. Richards, *An Introduction to Modern Architecture* (Baltimore, Maryland: Penguin Books, Inc., 1962), 31.

[20] Schulze, 96.

[21] Schulze, 96-97, 100-101.

[22] Hitchcock, 449.

[23] Richards, 71-72.

[24] Burchard and Bush Brown, 330.

[25] H.R. Dowswell, "Walls, Floors, and Partitions in the Tall Building," *Engineering News-Record* (Februarty 19, 1931): 319, 321.

[26] The exhibition on the International Style opened at the Museum of Modern Art on February 10, 1932, in the middle of the Great Depression. The style, with architecture stripped of ornament, was presented to a profession that was 85 percent unemployed and created an immediate sensation. James Marston Fitch, *American Building and the Historical Forces that Shaped It* (Boston, Massachusetts: Houghton Mifflin Company, 1966), 247-248.

[27] Fitch, 259-260.

[28] Pre-war masonry curtain walls could weigh up to 175 pounds per square foot. The new glass and metal curtain walls were designed to weigh about five to fifteen pounds per square foot. Building structures and their foundations could be more economical since they would be designed to support a lesser load. "The Trend to Building with Metal

Curtain Walls," *Engineering News Record* (20 October 1955).

[29] Paul Goldberger, *The Skyscraper* (New York, New York: Alfred A. Knopf, 1989) 103-105.

[30] In 1943, during the planning stages for the Equitable Building, Belluschi stated, "Our assumptions were affected by the peculiar circumstances found in our Northwest region - cheap power and a tremendous expanded production of light metal for war use, which beg utilization after the emergency." *Architectural Forum* (May 1943).

[31] "Icons of Modernism or Machine-age Dinosaurs?" *Architectural Record* (June, 1989) 145.

[32] Peter Carter, *Mies van der Rohe at Work* (New York, New York: Praeger Publishers, 1974), 46.

[33] "Icons of Modernism or Machine-age Dinosaurs?" 142.

[34] American Architectural Manufacturers Association, *Aluminum Curtain Walls*, Volume 5, 8.

[35] "The Trend to Building with Metal Curtain Walls," *Engineering News Record* (20 October 1955).

[36] *Aluminum Curtain Walls*, 8.

[37] "Metal Curtain Walls," *Proceedings of the Building Research Institute* (Washington, DC: National Academy of Sciences - National Research Council, 1955).

[38] At first caulking compounds, ubiquitous in today's curtain wall construction, were not recommended for sealing joints. They held little promise because they "fail due to expansion/ contraction and will require constant maintenance." John Hancock Callender, "The Design of Metal Curtain Walls," *Metal Curtain Walls: Proceedings*, 79-97.

[39] H. Wright, July 1955. A lesson had been learned at the United Nations Secretariat Building where the two all-glass facades had been oriented east and west and were subjected to the harsh rising and setting sun.

[40] Burchard and Bush Brown, 473.

[41] A.E.J. Morris, *Precast Concrete in Acrhtiecture* (London, Emgland: George Godwin Limited, 1978) 45, 66-71. Perret was the innovator of precast panels being used as cladding. At the apartment block at 51-55 rue Raynouard in Paris, he had hung precast concrete wall panels on a poured concrete frame in 1930. Adolph K. Placzek, editor in chief, *Macmillan Encyclopedia of Architects*, Volume 3. (New York, New York: The Free Press, A Division of Macmillan Publishing Co., Inc., 394.

[42] Morris, 161.

[43] Brick Institute of America, *Technote 40* (October-November 1973).

[44] Mark A. Wallace, "Brick Panels, Ohio Style," *The Magazine of Masonry Construction* (June 1990): 267.

[45] Ian R. Chin, John P. Stecich, and Bernard Erlin, "Design of Thin Stone Veneers on Buildings," *Proceedings of the Third North American Masonry Conference* (June 1985).

[46] Clare Monk, "The Rational Use of Masonry," *Proceedings of the Third North American Masonry Conference* (June 1985).

[47] Ada Louis Huxtable, *The Tall Building Artistically Reconsidered: The Search for a Skyscraper Style* (New York, New York: Pantheon Books, a division of Random House, Inc. 1982, 1984) 18.

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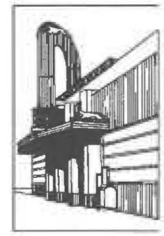

The Metal and Glass Curtain Wall

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The era following the Second World War saw the development of new technologies which had a fundamental effect on the curtain wall. Principal to these new technologies were improvements in aluminum, glass, sealants, and insulation materials.

Aluminum was first isolated in 1825 but was not produced on a large scale until after 1889, when Charles Martin Hall was granted a patent for a process by which aluminum could be made on a commercial scale.[1] By the 1920s, aluminum was being incorporated into building details such as doors, windows, trim, and exterior signage. Although aluminum costs three to four times as much as a comparable steel section, architects still found frequent cases where the expenditure was justified.[2]

The onset of the Second World War saw aluminum production soar, since it was the principal material of many war materials. During the war, more than 200 factories produced a multitude of aluminum shapes.[3] After the war, the abundant production capacity created a demand for new aluminum applications and at the same time the price plummeted.

Aluminum found a welcome niche in cladding curtain walls. The material was more corrosion resistant and lighter than steel and certainly much lighter than masonry. Aluminum curtain walls were relatively easy to erect, especially in cold weather which significantly limited the ability to erect walls of brick and mortar. Aluminum curtain walls were also thinner, freeing up valuable floor space for lease. This had the advantage of increasing the rentable floor area. This advantage was estimated to add $18 per linear wall footage in savings in the 1950s.[4]

The principal forms of aluminum were twofold: rolled aluminum sheet, which was flattened and stamped to create opaque wall panels; and extruded aluminum shapes, made by forcing the molten aluminum through a steel die. Extruded aluminum resulted in long lengths of aluminum of almost any cross sectional shape, only limited by the possibilities in die fabrication. Aluminum extrusions were highly consistent in dimensional qualities and were therefore usually employed as the principal framing members of curtain walls. Figure 1 shows the installation of fabricated sections at Mies van der Rohe's 860-880 Lake Shore Drive apartment buildings in Chicago.

While extruded aluminum was used as the framing members of curtain walls, glass was the principal material for the in-fill between those aluminum extrusions. The post-war commercial adaptation of air conditioning compensated for the heat gain and thermal inefficiencies of larger areas of clear glass. Large unimpeded views through clear glass had always been a desirable feature for the office environment. Now larger glass panels could be set within minimally thin aluminum "sticks."

Glass technology also made numerous advances in the post-war years. Prior to the 1950s glass for buildings was made by either the sheet or plate process. These processes had limitations on the size of the glass and were not able to produce absolutely flat and uniformly thick glass. This lead to inevitable distortion of vision through the glass process. [5]

In 1959, Pilkington Brothers Limited produced the first glass by the float method. This process which floats a ribbon of glass on molten tin

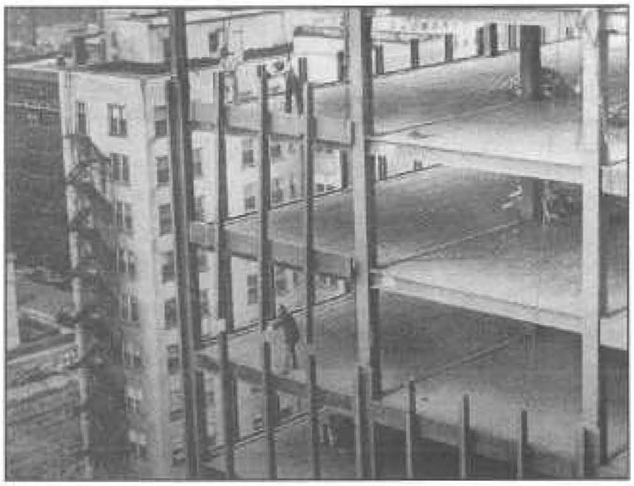

Figure 1. Construction photograph of 860-880 Lake Shore Drive apartment buildings, Chicago, Illinois (Mies van der Rohe, 1949-1951). The realization of Mies' 1920 proposal for a glass skyscraper, these were among the first residential buildings in the United States to be clad entirely in glass, with a two-story prefabricated steel and aluminum curtain wall system.

while heating both sides of the glass, produces perfectly flat and parallel surfaces. This technology took off and within a decade, float glass was produced in many different countries and was replacing the plate glass process.[6] Most float glass was finish by controlled cooling through a process called "annealing." As high performance coatings and uses for curtain wall glass came in demand, stronger glass manufactured by tempering or heat strengthening, instead of annealing, became popular.

Large glass panels had the disadvantage of transmitting heat and glare from the sun. Metallic oxides were added to the manufacturing of the glass to absorb heat and light and to aid in creating more comfortable conditions for building occupants. Still, large glass sheets will transmit significant heat gain in the summer and heat loss in the winter.

It wasn't until the energy crisis of the mid-1970s, that architects began to demand more efficiency from aluminum and glass curtain walls. Insulating glass (IG) units, created by factory sealing together two sheets of glass with a thin air space between them, vastly improved the energy performance of glass lites. Early IG units were sealed with a metal edge band. These have proven to be problematic, since water can become trapped between the glass and the metal edge band, ultimately leading to failure of the IG unit. Improvements in aluminum framing with plastic thermal break materials reduced conduction of heat through the curtain wall. More recently research into improving the thermal performance of glass has led to development of low-emissivity metallic coatings, gas filled units and photo-responsive units.

The demands of the aluminum and glass curtain wall also lead to improvements in joint sealants and thermal insulation materials. Early metal curtain walls were caulked with glazing compounds that quoting one practitioner, "were little more than vegetable oil stuff." Such caulking materials, proved to have little ability to stop water, and required frequent reapplication. Improved sealants were developed which adhered better to metal and glass and consequently were more watertight. Two-part elastomeric sealants principally made from polysulfide were developed in the late 1950s. These sealants were generically identified by the principal manufacturer, "Thiokol." The components were mixed with a paddle and had a limited four to six hour pot life. Later, Tremco developed a one-part sealant called "Mono" which, although the smell was less than appealing, exhibited tenacious adhesion. Mono sealants, however, hardened over time. This has contributed to glazing failures due to the hard sealant compressing on the glass. Contemporary one-part elastomeric sealants such as silicones and polyurethanes were first marketed in the 1970s, and remain the common sealant materials today.

Insulation materials such as fiber-glass and mineral wool blankets were developed by manufacturers such as Pittsburgh-Corning, Owens-Illinois, US Gypsum, and Johns-

Manville. These materials were touted for their significant contribution in reducing heat loss. One source noted that, "many of the insulating materials suitable for thin curtain wall construction are more than 15 times as effective as thermal insulators than ordinary masonry."[7]

Although the new materials had infinite promise in creating new claddings, many 1950s vintage curtain walls were only half-hearted efforts at incorporating the technology. Curtain walls often were little more than an assembly of old style aluminum windows held in place with a grid of reinforced mullions.[8] Many early "all-glass" curtain walls were actually backed by concrete block walls at each floor behind opaque glass, to satisfy prevailing fire code requirements.[9] Lever House in New York, shown in Figure 2, is an example of early curtain wall construction in the United States. The all glass building also suffered from a lack of consideration about orientation. Long walls of glass were faced on the south, east or west, which exposed occupants to the intense morning and afternoon sunlight and glare.[10] Glass exposed to direct sunlight has been found to cause thermal stresses that can crack the glass, especially in situation where the glass is partially shaded by awnings or deep exterior mullions.

Figure 2. Lever House, New York, New York (Skidmore, Owings and Merrill, 1952). The clean curtain wall appearance "belies its complex internal construction which was cobbled together from off the shelf parts," as described in "Icons of Modernism or Machine-Age Dinosaurs?" in Architectural Record, June, 1989.

The new curtain wall also created new problems, of which architects and builders were not completely aware. Interior condensation and rapid expansion/contraction became new design concerns. Although aluminum is corrosion resistant, mill finished aluminum can corrode over time and with exposure to atmospheric pollutants and moisture. Early curtain walls were also prone to leak. Furthermore, when water did get past the curtain wall, it was nearly impossible to track its path and find the leak. Therefore, early designers realized that they needed to find a way to let water that got into the wall back out again, before it became a leak on the interior. A double system of drainage with weeped internal gutters was commonly utilized to collect and hold water at the spandrel area. These gutters could be designed to hold up to a six-inch head of water, and to allow the water to drain out when wind pressure subsided. Problems with water leaks are still evident with many curtain walls due to the misunderstanding of how to design for water infiltration or due to poor quality workmanship in implementing a water resistant design.

Standards and the Metal and Glass Curtain Wall

As with any material in its infancy, it soon became apparent that standards of quality and performance were needed.[11] An early curtain wall symposium defined the ideal technical parameters of a metal and glass curtain wall as being between two and five inches thick; self-insulating; able to withstand high winds; weatherproof on the outer surface; vapor-proof on the inner surface; ventilated and drained for control of internal moisture; designed for expansion and contraction of the building; easily removable for repair; sound deadening; adaptable to all types of building frames; installed from the inside without scaffolding; easy to fabricate, ship, and handle; attractive; maintenance free; and moderate in cost. Furthermore, this system was intended to last 40 to 100 years.[12]

As the metal and glass curtain wall industry developed, and lessons were learned about the performance of these walls, it became apparent that performance testing of mock-ups of the

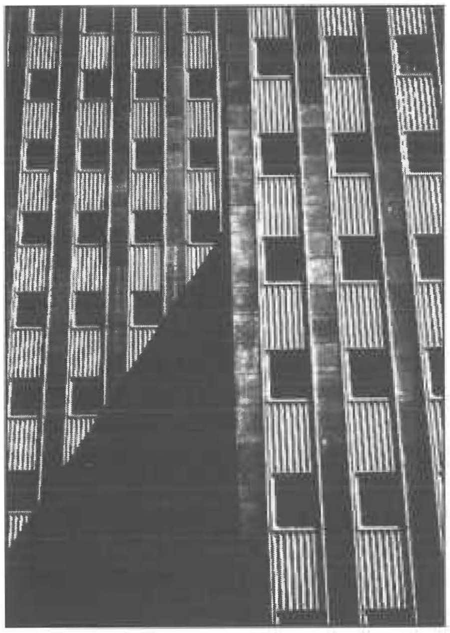

Figure 3. An early aluminum curtain wall used in conjunction with the then more traditional limestone curtain wall. The fluted aluminum spandrel plates and center pivot windows have contributed to water leakage over the years.

curtain walls could go a long way to alleviating expensive problems in the field. Some of the earliest mock-up tests of a metal curtain wall were performed in the early 1950s in a laboratory in Coral Gable, Florida. The tests were performed on curtain wall mockups for Chicago's 900-960 Lake Shore Drive Buildings designed by Mies van der Rohe. Similar to the mock-up testing performed today, these test subjected the mock-up to water and air pressure differentials, and used both static and dynamic test methods.

Guidelines for the performance of curtain walls were introduced through manufacturer's organizations such as the National Architectural Aluminum Manufacturers (NAAM) and later through the Architectural Aluminum Manufacturer's Association (AAMA). National consensus standard organizations, such as American Society for Testing and Materials (ASTM) have adopted many of these manufacturer's group standards. Through these organizations, structural performance, thermal performance, water resistance performance[13] and air infiltration limits[14] were established. More recently, requirements have been promoted for resistance to condensation[15] and for high performance paint coatings.[16]

As curtain walls became lighter and the buildings clad with these walls became taller, it soon became apparent that the most significant force acting on the curtain wall was not its own dead weight, but instead was the "live load" imposed on the wall by the force of the wind. Through the development of boundary layer wind tunnel testing, there arose a better understanding of the effect of wind loads on curtain walls. Wind tunnel testing revealed that not only was the wind force greater higher up on the building, but, wind forces varied considerably depending on the topographical conditions around the building, the shape of the building and the orientation of the building. Wind tunnel testing also clearly revealed the effects of vortex currents which create high wind suction at building corners.

Maintaining and Servicing the Metal and Glass Curtain Wall

Although the early advocates believed that curtain wall maintenance would require, "no painting, caulking or refinishing, cleaning not required for durability or appearance,"[17] this has not proven to be true. Curtain walls, like all claddings, require work to maintain them in a serviceable condition, and often require major repairs to restore them to their original condition.[18] These repairs are often undertaken to refresh a dated facade and to aid in leasing an older building.[19] With proper upkeep the 1950s and 1960s curtain walls can continue to last as long as their masonry counterparts.

Sealant replacement is the most common maintenance requirement for the middle-aged metal and glass curtain wall. Figures 3 and 4 show an early curtain wall and the maintenance for its continued performance. Early generations of polysulfide sealants become embrittled over time and will no longer stop water entry into the wall. "Mono" sealants can harden and contribute to glazing failures due to the sealant compressing the glass. Butyl sealants, which remain flexible over time, can be pushed out of the sealant joint by the repeating action of winds pushing against the aluminum and glass. Old sealants can usually be replaced by cutting out the old material and cleaning the substrate with a suitable solvent and clean cloth wipe. Then after preparation, the new material can be installed in a properly designed new sealant joint.

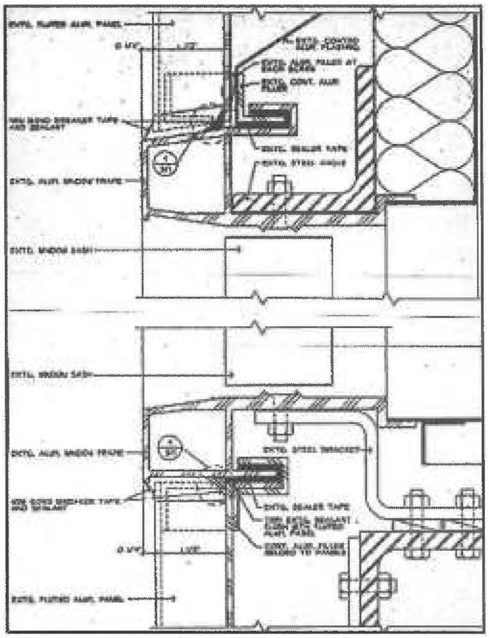

Figure 4. A section at the window head and sill conditions for the curtain wall shown in Figure 3. Sealant repairs have been specified at key locations to mitigate water leakage.

Glass replacement is sometimes warranted, either due to physical damage to the original glass or due to the benefits inherent with replacing older and often times energy-inefficient single-glazed curtain walls with high performance insulating glass (IG) units. Even early generation 1970s IG units may now need replacement, due to the breakdown of the metal edge bands and fogging of the IG unit with water vapor. Large glass units that pushed the limits of annealed glass for thermal stresses can crack and need replacement. Tempered glass can spontaneously break due to mineral inclusions in the glass and may require preventive measures to safeguard against glass fall-out. Laminating safety films are sometimes applied to the interior face of tempered glass to correct this problem.

Although the aluminum components of the curtain wall are considered corrosion resistant, mill finished aluminum can corrode over time with exposure to atmospheric pollutants and moisture. The anodized coating on finished aluminum can discolor and pit. Sometimes, the original color just looks old and tired, and like many building materials, requires a fresh coat of paint. High performance air drying paints are available for the repainting of aluminum curtain walls. These high performance paints are banned in some areas of the country because of volatile organic compound (VOC) restrictions.

When maintenance and servicing are not deemed sufficient to correct the look or function of an older curtain wall, recladding of the entire building is possible. The new lightweight aluminum curtain wall can be installed directly over the old wall. Even with the weight of two exterior walls, the system is still usually lighter than a masonry wall system. Prior to implementing an overcladding project, however, it is critical to consider what will be buried in the wall, such as internally corroded metals, water-damaged materials, and even molds and mildew.

The metal and glass curtain wall of the 1940s, 1950s, and 1960s was a product of its time: the continued desire for lightweight, high performance, and economical wall systems, coupled with industry advances from the war years. The industry has progressed with new standards of construction and methods for quality control testing to improve new construction. However, older metal and glass curtain walls can still serve for many years with careful maintenance and repair.

Notes

[1] Hiram Brown, *Aluminum and Its Applications* (New York, New York: Pitman Publishing Corporation, 1948), 11-12.

[2] *Civil Engineering* 9, no. 10 (October 1939): 622.

[3] Kent R. Van Horn, editor, *Aluminum, Volume 3: Fabrication and Finishing* (Metals Park, Ohio: American Society for Metals, 1967), 81.

[4] R. Davidson, "Curtain Walls," *Architectural Forum* (March 1950): 81-94.

[5] Rune, Perrson, *Flat Glass Technology* (New York, New York: Plenum Press, 1969): 8-17.

[6] Ibid., 18-19.

[7] *Architectural Forum* (March 1950): 83.

[8] American Architectural Manufacturer's Association (AAMA), "A Brief History of the Aluminum Curtain Wall," *Aluminum Curtain Wall Design Guide Manual* 5 (1979), 61-66.

[9] *Architectural Forum* (March 1950): 82.

[10] H. Wright, "What Next for the Window Wall?" *Architectural Forum* (July 1955): 169-173.

[11] AAMA, *Aluminum Curtain Walls*, 66.

[12] John H. Callendar, "The Design of Metal Curtain Walls," *Metal Curtain Walls: Proceedings of the Building Research Institute* (Washington, DC: National

Academy of Sciences - National Research Council, 1955), 79-97.

[13] The standardized water testing is performed in accordance with ASTM E331 for laboratory mock-up testing and ASTM E1105 for field testing of the as-built curtain wall. Another way of measuring water penetration performance is dynamic pressure testing in accordance with AAMA 501.1. This testing utilizes a large fan or an airplane engine to simulate the dynamic effects of blowing water during storm conditions.

[14] Standardized air infiltration tests are performed in accordance with ASTM E-283, with the same curtain wall mock-up as water tests.

[15] AAMA 1503.1 defines a test method to establish a condensation resistance factor (CRF) for the curtain wall. The CRF is a relative number that indicates the thermal performance level of a small portion of the curtain wall when subjected to a standardized thermal chamber test.

[16] High performance coatings typically meet the performance requirement of AAMA 605.2, "Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels." The most common coatings that currently comply with AAMA 605.2 are usually based on the fluoropolymer PVDF, best known commercially as "Kynar 500."

[17] Callendar, page 81.

[18] "Casing Out Curtain Walls," *Building Renovation* (Winter 1994).

[19] "Middle-Age Makeovers," *Architectural Record* (March 1991).

The Development and Conservation of Thin-Stone Veneer

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Thin-stone veneer is building stone[1] cut to less than two inches thick, applied to a building facade in a non-load bearing manner. Granite[2], marble[3], travertine[4], limestone[5], and slate[6] are the most common stone materials used with a variety of surface finishes and colors to achieve various architectural effects. The use of thin-stone veneer began at the end of the nineteenth century with the advent of skeleton frame building construction but was very limited. Up until the 1950s thin-stone veneer was typically used for interiors, street level facades, store fronts, and bulkheads. One of the first uses of exterior thin-stone veneer was on the first floor facade of the Reliance Building built in Chicago in the 1890s. The use of thin-stone veneer construction was primarily limited because methods of properly attaching thin stone to the steel structure had not been developed. At the Reliance Building the granite was supported by cast-iron grillework.

Early Fabrication and Installation Techniques
Prior to 1900, building stone blocks from the quarry were hand fabricated and finished into thick slabs or blocks. Early in this century the stone fabrication process was mechanized with the introduction of multi-bladed frame-saws or gang saws and wet cutting.

In 1932 the National Building Granite Quarries Association, Inc. (NBGQA), described the gang saw process used to fabricate granite panel veneers as thin as one inch thick.[7] This process was described as "almost entirely by machine." Most quarries, however, promoted the use of 1-1/2 inch thick veneer.

In installation, veneer panels were typically laid up on mortar beds and joints were finished with mortar in a manner similar to traditional masonry construction. Lateral anchoring of exterior panels typically consisted of galvanized and asphalt coated steel rods which were turned down into holes drilled into the edges of the panels. Plaster of Paris was recommended as a quick setting spacer. Manufacturers typically recommended four anchors per panel, with two anchors on parallel sides. The anchor sides could be top to bottom or side to side.

Post-World War II Fabrication and Installation Techniques
By the mid-1940s the use of thin-stone veneer for entire building facades was just beginning. In 1940 Cold Spring and North Star Granite Corporation promoted the use of one inch thick granite veneer[8]. In 1944 Aberene Stone Company promoted slate veneer as thin as 7/8 inch thick. Manufacturers advised the use of a shelf angle at each floor to help carry the weight of the panels. Typically joints were still to be filled with mortar. Thin-stone lateral anchors were typically brass or steel rods set into holes filled with cement mortar. For stone over two inches thick, 1-1/4 inch by 1/4 inch steel straps were used. Four anchors per stone were typically recommended for stone up to twenty square feet.

In the late 1940s strap anchors became more prevalent for lateral support of thin-stone veneer. For re-cladding, the anchor was twisted ninety degrees and mortared or plastered into a dovetail slot in the back-up masonry. In new construction, the straps were mechanically fastened into the backing material. The straps could be bent out of the way during initial setting of the veneer, then bent into a kerf or slot, providing easy installation. The straps were

typically stainless steel and were 1 inch wide by 3/16 inch thick for "thicker" stones and 1/16 inch thick for thin-stone veneer. Straps were turned down 3/4 inch into thick stones and 1/2 inch into thin-stone veneer.

In the early 1950s stone was typically produced in thickness of 7/8, 1-1/4, 1-1/2, and 2 inches, although 1-1/2 inch was usually recommended for veneer. Some manufacturers began to recommend that stone less than 1-1/2 inch not be used, claiming that thin-stone, such as 7/8 inch thick, was more expensive to produce. Industry standards listed tolerance as plus-or-minus 1/4 inch and joint spacing between panels was 1/4 inch. Expansion joints were also recommended every thirty feet horizontally and every second floor vertically. A cavity of about one inch was still suggested behind panels. Filling the cavity with mortar and coating the backs of the panel with damp proofing was promoted in some instances. During this time veneer panels with overall dimensions between 3 x 3 feet and 4 x 4 feet were used.

Further Development of Thin-stone Veneer
The use of thin-stone veneer increased in the 1950s with the rise in popularity of the metal and glass curtain wall and lower cost resulting from improved fabrication efficiencies with the introduction of diamond-bladed tools.

By the mid-1950s, thin-stone veneer construction was becoming much more refined. Horizontal joints between panels were sometimes sealed with elastomeric sealant rather than mortar. Shims such as aluminum, plastic, or lead were placed in horizontal joints to transfer panel weight. Manufacturer's recommendations became more conservative by increasing the number of lateral anchors. For panels less than twelve square feet, four anchors were recommended. Six anchors were recommended for panels between twelve and twenty square feet. For pieces larger than twenty square feet one anchor was suggested for every three square feet. Many different types of lateral anchors, including stainless steel straps, brass dowel and wires, disks were in use by this time. The incorporation of gravity and lateral support in the same anchor was developed with a split-tail anchor, or in some cases steel tabs were welded to relief angles.

By the late 1950s, stone was being incorporated into composite building panels. Most common among these was precast concrete panels faced with a thin-stone veneer. Typically, hairpin wire anchors or dowel anchors were preset into the back of the stone panel prior to casting. The precast concrete/thin-stone veneer unit was then formed by placing the concrete against the backside of the stone panel with the panel set face down in a form. During this period a bondbreaker sheet or coating between concrete and stone was not usually incorporated prior to casting the concrete. This technique of separating materials was more commonly used in the later 1960s.

Construction of thin-stone veneer began to become more standardized in the 1960s. Publication of the *Marble Engineering Handbook* by the Marble Institute of America and *Marble-Faced Precast Panels* published by the National Association of Marble Producers, provided rational approaches to the design, construction, and use of thin-stone veneers[9]. At this time prominent buildings such as the John F. Kennedy Center for the Performing Arts in Washington, DC, and the Amoco Building in Chicago, Illinois, were clad with thin-stone veneer.

In the 1970s, the Italian marble industry developed diamond-studded cables which were used to slab blocks and further increased fabrication efficiency. Traditional support techniques were combined with specially shaped and continuous steel support elements which facilitated greater setting flexibility. Specialized anchors were also being developed by different manufacturers which engaged the back of the panels with stainless steel threaded fasteners allowing veneer panels to be installed on a truss prior to being shipped to a building.

Current Fabrication and Installation Techniques
In the 1980s, techniques for thermal finish and water blast finishes developed. Also, frame saws along with metal abrasives were being used for cutting stone as thin as 1/8 inch. As a result, composite panels which combined a very thin-stone adhered to a honey-comb core or other backing material became available. The long-term durability of these relatively new products is not well known.

These developments along with the an overall increase in building construction in the 1980s resulted in a 600 percent increase in the use of marble and 1,735 percent increase in the use of granite between 1980 and 1985[10]. Today thin-stone veneers are typically supported on shelf angles attached to the back-up wall or building frame. The shelf angles often are constructed of

stainless steel, aluminum, or mild steel with a non-corroding material separator between mild steel and stone. An example of this type of construction is shown in Figure 1. Sometimes metal tabs or dowels are fastened to the supporting leg of steel or stainless steel angles. Aluminum shelf angles are usually extrusions that include a tab. These tabs or dowels are dry set or set in adhesives in kerfs or oversized holes on the edge of the panels for lateral support. Anchors today are typically constructed of stainless steel or aluminum, as opposed to painted or galvanized mild steel or copper used in years past. Usually, these anchors are placed intermittently along the edges of the panel, but in some cases may be continuous along two opposite edges. Clip angles placed along the bottom of the panel may also provide gravity support for the panel. Sometimes a disk-shaped anchor is set into a kerf or slot cut into the sides of two adjacent panels. The disk anchor is fastened back to the structure with a rod.

Thin-stone veneer may also be anchored to precast concrete backup panels or a steel frame with anchor components that provide both lateral and gravity support as described above. An example of thin stone attached to precast concrete is shown in Figure 2.

Thin-stone veneer continues to be a popular material for use both on the interior and exterior of buildings. Economies have resulted in the minimizing of the amount of stone required to obtain the desired aesthetic. Over the past seventy years, technology and economics have resulted in a dramatic reduction in the thickness of stone used on buildings, resulting in an equally dramatic increase in the use of thin-stone veneer.

Distress Types and Causes

Distress Related to Connections and Support Components

The vast majority of distress observed in stone cladding is associated with connections and support components. The major types of distress observed with these typical anchorage systems include cracks at or around anchor locations, spalls at anchor locations, spalls at shelf angle supports, cracks at panel corners, panel displacements, and rust staining. There are a number of factors that can cause or contribute to these types of distress. Improperly-designed anchors can lead to spalling and cracking of adjacent stone, or displacement of the panel. If anchors are missing, loads can be exerted on existing anchors that are greater than the loads for which the anchors were designed. This can result in failure of the anchors and distress to the stone. Water penetrating the cladding can cause corrosion of metal anchors or shims. Other factors include improper attachment of anchors to the building structure, improper positioning of anchors in the cladding, or missing slip sheet.

Distress Related to Loss of Material Strength

All natural building stone exhibits strength loss with time from the effects of cyclical heating and cooling, water penetration, cyclical freezing and thawing, and the effects of acid rain. Materials such as marble typically exhibit more strength loss over time than granites. The degree of strength loss is also related to the panel thick-

Figure 1. Thin stone granite panel being installed onto metal frame.

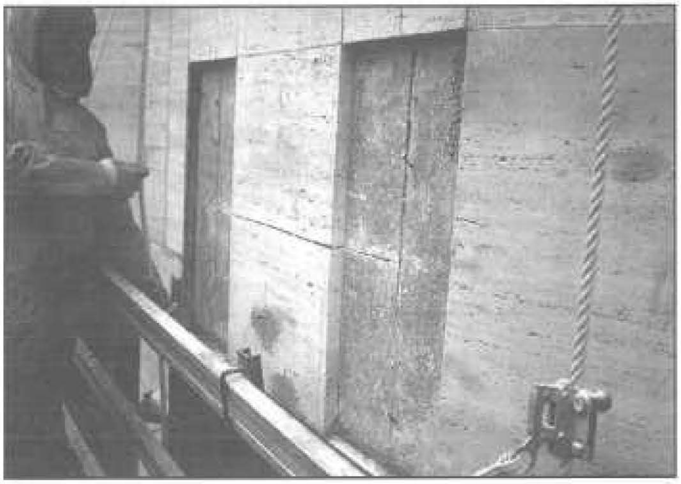


Figure 2. Thin-stone panel on precast concrete backup. Portions of stone have been removed, exposing concrete and bent wire anchors.

Figure 3. Thin-stone panel repair of thin-stone travertine attached to precast concrete.

ness; the thinnest panels can be expected to be most affected by strength loss.

Stone curtain walls usually rely on strength of the stone panel material to span between connections. If the material is not strong enough, either from improper design or from aging, it may exhibit distress such as cracking between supports, or bowing.

Typically, marbles are not volume stable and experience permanent volume growth with heating and cooling cycles. This permanent growth reduces the strength of the material, and can lead to warping and bowing, as the opposite sides of the panel experience differential thermal expansion. The other stone types typically are volume stable.

Certain visible characteristics of the stone have been found to be correlated with strength loss. These include bowing, warping, saccharification (sugaring of the surface), exfoliation, existence of stylolites[11] and other variations in the surface appearance. In extreme cases, cracking of the stone may be related to strength loss. Significant veining of the stone, caused by mineral impurities, may or may not be related to the existence of planes of weakness or strength loss of the panel.

Even within one type of stone, stone composition can vary considerably, and stone units may behave differently. All stones, including granite, marble, limestone, and slate, have a natural bedding orientation. Depending on the direction in which the stone types are fabricated,

strength and durability may vary. Even similar marbles fabricated in different orientations can behave differently because of the alignment of the crystals in the stone structure.

Distress Related to Building and Wall Movements
Distress in stone cladding units can be related to building and wall movements or differential movements that are not accommodated by the cladding design or by the construction of the cladding system. If insufficiently-sized joints are used to accommodate building or wall movements, cladding panels can come in contact with each other during thermal expansion or building movement. This could result in cracking and spalling near the edges and corners of the panels, and in failed or distorted sealant joints.

Distress Related to Staining and Discoloration
Distress can also be related to staining and discoloration. These problems are not usually a structural or safety concern, and may be related to preferential weathering of mineral components of the stone; corrosion of embedded ferrous components of the stone; water runoff containing staining elements from other materials such as copper or iron; and improper cleaning or maintenance. Staining can also be related to excessive water leakage through joints or behind the cladding units. This may indicate associated corrosion of embedded metal elements, and may be a structural concern. Some types of staining may be related to sealant materials in adjacent joints.

Repair of Thin-Stone Veneer
Repairs to stone cladding most often involve repair or replacement of connections and support components, and may also involve selective or complete replacement of the cladding. If it is determined that additional positive mechanical anchorage is required, through-bolt anchors covered over with sealant, mortar, or a stone plug set in mortar are most commonly used when only a few units need repair. An example of thin-stone panel repair is shown in Figure 3. Expansion anchors can be attached to the precast backup, or dowels set in epoxy can be attached to the precast backup or to adjacent stable panels.

Often, isolated repairs can be installed directly at the locations of distress adjacent to anchors by reanchoring the cracked portion of the panel. If the cladding is fractured, the panel could fall outward. Where a portion of the stone panel is severely distressed, that portion of the stone can be removed and a dutchman replacement unit installed in its place. Dutchman units are typically pinned or fastened to the existing adjacent stone or backup.

Where distress has been caused by unaccommodated building and wall movements, repairs may entail grinding the joints to make them wider so that movement can occur. Also, any extraneous materials must be removed from the joints.

Where distress evidenced by staining and discoloration has occurred and the causes of have been determined, it may be desirable to clean the stone cladding. Typical cleaners employed on stone facades include water washes, mild detergents, and alkali prewash/ mild acidic afterwash chemical systems. New, non-traditional mechanical cleaning systems that do not significantly abrade the stone substrate have recently provided good results in test programs, but do not have a long history of use. Any proposed cleaning system should be thoroughly evaluated through laboratory and field studies prior to implementation. The gentlest effective system should be selected.

In some cases, removal and reinstallation or replacement of the stone cladding units can be considered. For example, where significant loss of material strength has occurred, and additional anchors will not provide adequate support, the panels will likely have to be replaced. Replacement in kind, or with a different and more serviceable stone cladding, may be appropriate.

For most repairs, field or laboratory testing of proposed repair methods is recommended before the repairs are implemented. Durability tests can be performed on the proposed repair or anchorage system to provide an assessment of expected service life for the repairs.

Selection of a thin-stone veneer material for selective replacement, overall recladding, or new construction is often predominantly based on aesthetics. The performance characteristics of the replacement stone should be evaluated and a rational structural design should be undertaken. Testing should be performed on the stone selected, on anchorage components and in some instances, whole assemblies.

Material testing should be performed in accordance with ASTM (American Society For Testing and Materials) Test Methods[12]. These include tests to determine flexural strength, compressive strength, density, absorption, and aging characteristics.

As thin-stone veneers age and deteriorate the need for intervention is more critical than what has typically been required for more traditional thick masonry construction. Thin-stone veneer construction, as opposed to load bearing masonry construction, usually does not have the redundancy to overcome design or construction shortcomings or excessive aging deterioration. For this reason thin-stone veneer construction, even though it is a relatively recent type of construction, will likely have an ever-increasing need for preservation.

Notes

[1] Building Stone - natural rock of adequate quality to be quarried and cut as dimension stone as it exists in nature, as used in the construction industry. ASTM C119, "Standard Terminology Relating to Dimension Stone."

[2] Granite (commercial definition) - a visibly granular, igneous rock generally ranging in color from pink to light or dark gray and consisting mostly of quartz and feldspars, accompanied by one or more dark minerals. The texture is typically homogeneous but may be gneissic or porphyritic. Some dark granular igneous rocks, through not properly granite, are included in the definition. ASTM C119, "Standard Terminology Relating to Dimension Stone."

[3] Stone considered marble must be capable of taking a polish. Stone in this category comprises a variety of compositional and textural types, ranging from pure carbonate to rocks containing very little carbonate that are classed commercially as marble (for example, serpentine marble). Most marbles posses an interlocking texture and a range of grain size from cryptocrystalline to 5mm.

Marble (calcite, dolomite) - a carbonate rock that has acquired a distinctive crystalline texture by recrystallization, most commonly by heat and pressure during metamorphism, and is composed principally of the carbonate minerals calcite and dolomite, singly or in combination.

Limestone marble, a compact, dense limestone that will take a polish, is classified as marble in trade practice. Limestone marble may be sold as limestone or as marble.

Recrystallized limestone, compact microcrystalline limestone, and travertine that are capable of taking a polish are also included in the category *commercial marble* and may be sold as either limestone or marble.

Source for definitions: "ASTM C119, Standard Terminology Relating to Dimension Stone."

[4] Travertine - a variety of crystalline or microcrystalline limestone distinguished by layered structure. Pores and cavities commonly are concentrated in some of the layers, giving rise to an open texture. ASTM C119, "Standard Terminology Relating to Dimension Stone."

[5] Limestone - a rock of sedimentary origin composed principally of calcium carbonate (the mineral calcite), or the double carbonate of calcium and magnesium (The mineral dolomite), or some combination of these forms. ASTM C119, "Standard Terminology Relating to Dimension Stone."

[6] Slate - microcrystalline metamorphic rock most commonly derived from shale and composed mostly of micas, chlorite, and quartz. The micaceous minerals have a subparallel orientation and thus impart strong cleavage to the rock which allows the latter to be split into thin but tough sheets. ASTM C119, "Standard Terminology Relating to Dimension Stone."

[7] National Building Granite Quarries Association, Architectural Granite, *Sweet's Catalogue*, 1932.

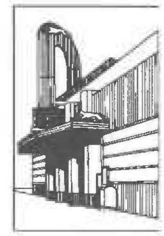
[8] *Sweet's Catalogue*, 1944, information from company brochures.

[9] Antonio Consiglio, *A Technical Guide to the Rational Use of Marble* (Italian Marble Industry Association, 1970).

[10] Christine Beall, *Masonry Design and Detailing*, third edition (New York, New York: McGraw-Hill, Inc., 1993), 93.

[11] Stylolites - an irregular surface, generally parallel to a bedding plane, in which small toothlike projections on one side of the surface fit into cavities of complementary shape on the other surface; interpreted to result diagenetically by pressure solution.

[12] ASTM C615 for Granite Dimension Stone; ASTM C503 for Marble Dimension Stone; ASTM C568 for Limestone Dimension Stone; and ASTM C629 for Slate Dimension Stone.



The Development of Sealants and Their Significance to the Modern Curtain Wall

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Introduction

For most sealant investigations it is important to know the sealants that have historically been used, and when they became available to the building industry. It is also important to know the typical behavior characteristics and failure mechanisms of the sealants commonly used in building construction.

Because elastomeric sealants in building facades usually provide the first defense and sometimes only defense against water penetration and air infiltration through building joints, they are a key item to be investigated for most curtain walls. Modern joint sealants are typically elastomeric materials that form a barrier to air and water, adhere to joint walls, and remain flexible when exposed to the weathering, to maintain a sealed joint.

The four principal characteristics of sealant are adhesion, cohesion, elasticity, and weathering ability. Adhesion is the property that describes the sealant's ability to bond to the adjacent substrate. Cohesion is a measure of the integrity of the body of the sealant; it describes the sealant's ability to resist cracking and tearing within itself. Elasticity is the property by which the sealant accommodates joint movement without adhesive or cohesive failure or permanent deformation. Ability to resist weathering is the property of the sealant to retain its physical characteristics when exposed to the environment.

A wide range of conditions can affect the way sealants perform in buildings. To evaluate the performance and serviceability of building sealants either solely or as part of a building conservation program, a thorough understanding of these materials is important. In the conservation of building facades it is also important to identify previously used sealants and evaluate their performance.

A variety of elastomeric sealants are used today in building construction to seal joints between various building elements. They include the more commonly used and well known sealant types such as silicone, polyurethane, polysulfide, acrylic, "latex," and butyl based products. Sealants are usually placed in joints as a viscous liquid that is either pourable for horizontal applications or non-sagging for vertical surface joints. Some sealants are designed to withstand vehicular and pedestrian traffic. Sealants can be either single component, not requiring mixing, or multi-component, requiring mixing of two or three components just prior to application.

History Of Sealants

Oil and resin based caulks were the only materials available in building construction for sealing building joints prior to about 1950. Oil-based caulk, which was being used as early as the turn of the century, was often termed "putty."

Construction requiring sealed joints prior to the 1950s typically was bearing masonry having joints that experienced little movement. Oil-based caulks, including those manufactured prior to the 1950s, met this need, having very

limited movement capability. However, these caulks are not considered elastomeric sealants. Although the movement capability of these caulks were limited, they usually proved to be adequate for sealing joints in construction of that time period, particularly when painted regularly. Since the life expectancy of oil-based caulks is about three to five years, most older buildings that originally had joints sealed with oil-based sealants have had the oil-based sealant replaced by newer, better performing sealants.

With the increased popularity of modern curtain wall construction in the 1950s, the demand increased for a sealant joint material that could seal joints experiencing greater movement. The first of the elastomeric joint sealants that became widely used was polysulfide sealant. This type of sealant became available to the construction market in the early 1950s.

Polysulfide sealant is a high performance sealant that is based on a synthetic polysulfide polymer or rubber,[1] based on the polysulfide polymer developed by the Thiokol Chemical Corporation in 1929.

The popularity of polysulfide based sealants grew rapidly to the point where during the 1970s approximately thirty-five different formulations of polysulfide sealant based upon the Thiokol polymer were available.[2] These formulations that were made by various manufactures were performance tested and approved for use by Thiokol. Since a variety of companies manufactured polysulfide sealants, formulations varied. For example, some polysulfide sealants used polychlorinated biphenyls (PCBs) as a plasticizer.

Competition from excellent urethane and silicone sealants became strong during the 1970s. However, many buildings still have joints containing polysulfide sealant since the service life of some polysulfide sealant under certain conditions can exceed twenty years. Polysulfide sealant also remains in some joints that are covered by newer applications of other types of sealant.

Silicone sealants are high performance sealants that did not become widely available to the building construction industry until around 1960,[3] although, the development of the silicone polymer used in silicone sealants dates from the early 1800s. Since the 1930s, silicone polymer has been developed for use as a sealant by the Dow-Corning Corporation and by the General Electric Corporation. The first silicone sealants were two-component products developed in the early 1950s.[4] Silicone sealants applied at building sites have been primarily one-component products that are cured by moisture.

Silicone-based sealants are high-performance sealants that are most frequently used for non-porous surfaces in high-movement joints. They are commonly used for metal and glass cladding substrates. Staining of porous substrates and dirt accumulation have been an ongoing problem for some silicone sealants.

Silicone sealants as originally produced had movement capability of plus or minus fifty percent. Today the movement capability of silicone sealants varies depending on type but can be as high as plus 100 to minus 50 percent.[5] They typically have better UV heat, and moisture stability, than other types of sealants.

Performance: An often-observed problem with silicone sealants is staining. As with some other types of sealants, staining can be evidenced by dirt accumulation on the sealant itself, or by migration of the sealant plasticizer into the adjacent substrate. For example, some stone substrates are particularly vulnerable to migration and silicone staining from certain silicone sealants.

Like other types of sealants, silicone sealants can fail if the substrate is improperly primed or cleaned, and they can fail progressively if water gets into the joint and behind the sealant, in absorbent backup material such as open-cell backer rod.

Urethane sealants are based on polyurethane synthetic rubber which was first developed in Germany and in England in the 1940s.[6] In the 1960s the first sealants became available that were based on the urethane rubber.[7] These sealants were first used in joints where abrasion resistance was required such as traffic areas. By the early 1970s urethane sealants were available from various manufacturers.

Urethane-based sealants are high-performance sealants most frequently used for porous surfaces in high-movement joints. These sealants are commonly used for cladding joints. Urethane sealants as originally produced typically had a movement capability of plus or minus twenty-five percent. Today the movement capability of some urethane sealants is as high as plu or minus fifty percent.

Performance: Problems with multi-component urethanes are usually related to incomplete or improper mixing, incomplete curing, and curing at high temperatures.

One-component urethanes, in contrast to multi-component urethanes, cure by reacting with moisture in the air. Under high temperature and high humidity curing conditions some urethanes will develop excessive bubbling and blistering, particularly one-component urethanes.

Acrylic sealants are based on acrylic polymer technology that dates to 1843, and the first production of acrylic polymers took place in the 1920s.[8] Acrylic sealants first became available to the building construction industry in the early 1960s. The first acrylic sealant was developed by the Tremco Manufacturing Company in 1958. The use of acrylic sealants peaked in the mid-1970s.

Latex caulks were developed in the 1950s and typically are based on acrylic, styrene-acrylic, vinyl acrylic, polyvinyl acetate, and styrene butalene. Latex caulks became available to the construction industry in the mid-1960s. Latex caulks have limited movement capability and are typically used in light building construction and residential construction.

Plasticized acrylic latex sealants became available in the mid-1980s.[9] Plasticized acrylic latex sealants have improved movement capability over the older original latex caulks and have movement capability of plus or minus twenty-five percent.

Butyl sealants that are butyl rubber-based[10] became available to the building construction industry in the mid-1950s, although butyl rubber was being manufactured earlier in the century for other uses.[11] Butyl rubber (a synthetic rubber) was developed to replace the natural rubber which was in great demand just prior to and during the Second World War. Butyl rubber-based sealants are one-component and have a limited movement capacity. They are typically for glazing joints and splice seals in window units, and not used between joints in curtain wall components that are exposed.

Joint back-up materials have typically been recommended by manufactures of high performance sealants since the late 1950s. Since then, the depth of the sealant in joints has been controlled with foam backer rod fillers made of polyethylene or polyurethane, or polyethylene bond breaker tape. Some sealants formed bubbles while curing because of air or gases that were released from certain closed cell back-up materials cut during sealant installation. To help eliminate this problem, a new type of backer rod was developed. This rod was open cell foam with a continuous skin on its surface.

Conservation

For practical purposes, in building conservation, sealants are usually removed or replaced. Under certain circumstances, it may be possible to retain sealant that is performing adequately at specific locations.

Characteristic evidence of sealant deterioration or failure such as cracking, wrinkling, sagging, bubbles in the sealant surface, separation within the sealant (evidenced by splitting) or between the sealant and substrate, evidence of primer, and staining of the sealant itself or of surfaces adjacent to the sealant may be made through direct visual examination.

In conservation of sealant the four characteristics: adhesion, cohesion, flexibility of the sealant, and weathering, should be evaluated. Loss of adhesion results in separation of the sealant from the substrate. An example of adhesion loss is shown in Figure 1. This is usually visible in openings along either side of the joint, but may not be obvious if the joint is compressed. Coatings or contaminants on the substrate surface may interfere with proper adhesion of the sealant.

Loss of cohesion is evidenced by cracking parallel to the surface of the adjacent substrate. An example of cohesive sealant failure is shown in Figure 2. Loss of flexibility can be associated with adhesive or cohesive failure, and is indicated by the inability of the sealant to recover after deformation, and increased hardness of the material.

Poor weathering is indicated by chalking, discoloration, random or alligator cracking, wrinkling, erosion, or excessive softening. The extent and location of the failure should be determined through visual examination of the sealant. The different types of sealant and substrate present, and an evaluation of existing conditions, should be made through closeup visual and tactile examination. The existing sealant profile, joint configuration, uniformity, and the presence of voids and air pockets should be obtained from removed samples.[12]

Figure 1. Example of unadhered sealant in horizontal joint between granite panels.

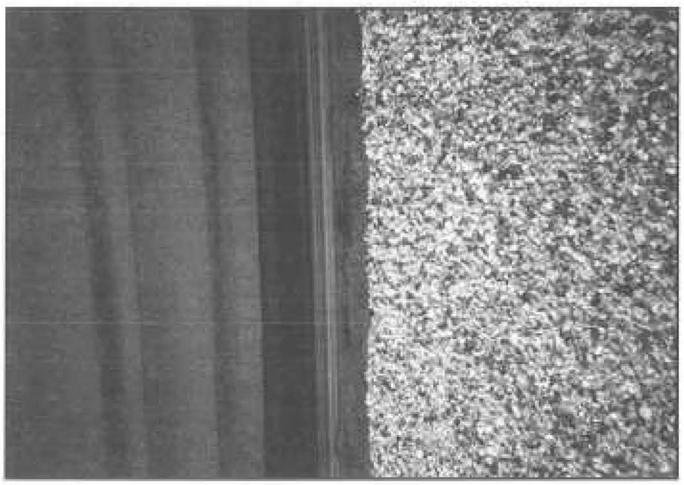


Figure 2. Example of cohesively-failed sealant in vertical joint.

In sealant conservation visible and tactile characteristics such as excessive softness, tackiness (stickiness), fluidity (flow characteristics), and cracking should be evaluated. Elongation (the ability of the sealant to be stretched) and elasticity (the ability of the sealant to return to its original dimension after stretching) characteristics can be evaluated through laboratory testing. Color can be an indication of type of sealant, improper mixing or curing, or other conditions. Sealant composition and identification of components can be determined through laboratory testing.

Failure Causes

Sealant-related problems in building facades can be related to inappropriate sealant selection, improper joint design or sealant installation, inherent problems in the sealant, poor condition of substrate or aging deterioration.

Improper joint design or improper selection of sealant for the joint size can result in failed sealant. This can occur when a sealant does not have the extension or compression capability to accommodate movement of the adjacent substrate. Sealant characteristics for modulus of elasticity and elongation should be considered and evaluated.

Improper installation of sealant can also contribute to failure. For example, sealants must be properly configured in the joint to accommodate movement of the joint. Sealants are typically installed with polyethylene bond breaker tape, compressible foam backer rod, or other means to prevent adherence of the sealant to the back as well as the sides of the joint. Sealant that is

adhered to the back as well as sides, tends to tear before its potential movement capability is attained. Sealant installed when the substrate or ambient temperature is too cold (below 45 degrees Fahrenheit), may not be able to accommodate subsequent expansion of the substrate and compression of the joint upon heating. Conversely, if the sealant is installed when temperatures are too high (above 90 degrees Fahrenheit), the joint may be at its narrowest dimension, and the sealant may be unable to accommodate expansion of the joint upon cooling. If sealant is installed at very cold temperatures, there may be frost contamination on the surface that will interfere with proper bonding and curing. If the sealant is installed at very hot temperatures it may flow, and its durability may be adversely affected. This is especially likely to occur with dark-colored sealants in locations that are exposed to direct sunlight.

Proper selection of sealant for compatibility to substrate should also be evaluated. If the substrate is different on either side of the joint, different preparation may be required for each substrate. Certain types of sealants cannot bond to certain other sealants. For example, sealant other than silicone are rarely capable of providing strong, durable bonds to existing silicone. Also, silicones will not cure properly when installed over isobutylene sealants. It is generally desirable to avoid installing sealant over an existing sealant, as this may create a poor bond. Sometimes, sealant installed on glazing is susceptible to poor adhesion because of contaminants on the glass surface.

Also, some sealants cannot bond to fluoropolymer architectural finishes without the use of a primer and special preparation. In some instances, solvent-based sealant placed over thermoplastic coatings can partially dissolve the coating. As the sealant shrinks, partial failure of the bond between paint and substrate will occur. Many sealants require installation of a primer coating to the substrate before application of the sealant.

Sealant Selection

For conservation as well as new construction typical applications of sealant include joints between stone veneer, concrete, or metal cladding panels; at stone to flashing joints; at window and door perimeters and at glass and glazing perimeters; at masonry expansion and coping joints; and at joints in horizontal surfaces such as plazas and terraces.

Currently, sealant types most often selected for joints that will experience significant movement are silicone or polyurethane-based sealants. However, selection of a specific sealant type depends upon the joint width, substrate, movement requirements, aesthetics, intended service life, previously used sealant and cost. For building preservation projects, understanding the properties and performance of the sealant material previously used can aid in conservation of the existing sealant and in selecting a new replacement sealant. Understanding the performance properties of the various replacement sealants available will benefit conservation of the entire building.

Notes

[1] Polysulfide polymer is a mercaptan terminated, long-chain aliphatic containing disulfide linkages.

[2] Julian R. Panek and John Philip Cook, *Construction Sealants and Adhesives*, third edition (New York, New York: John Wiley and Sons, Inc., 1991), 107-117.

[3] Ibid., 118-128.

[4] Ibid.

[5] J. M. Klosowski and G.A.L. Gant, *The Chemistry of Silicone Room Temperature Vulcanizing Sealants, in Plastic Mortars, Sealants and Caulking Compounds*, (Washington, DC: ACS Symposium Series 113, American Chemical Society, 1979), 82-83.

[6] Panek and Cook, 129-137.

[7] Urethane sealant is based on a polymeric material prepared by the isocyanate addition polymerization reaction between di or polyisocyanates and di or polyfunctional hydroxyl compounds.

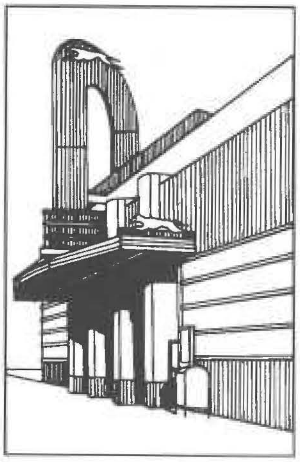
[8] Panek and Cook, 159-163.

[9] Ibid., 170-173.

[10] Butyl rubber is based on the polyisobutylene polymer, which is manufactured from gaseous hydrocarbons. Butyl rubber, a synthetic rubber, also contains a small percent of isoprene.

[11] Panek and Cook, 175-180.

[12] It is important to note that some sealants have been found to contain hazardous substances. For example, some polysulfide sealants applied during the 1960s have been found to contain polychlorinated biphenyls (PCBs) which are a suspected health hazard. Also, asbestos fiber and lead was used as components of oil-based sealants available in the 1950s. Therefore, special handling and disposal procedures are required for any conservation program. It is necessary to conduct laboratory testing to determine if a particular sealant has PCBs.



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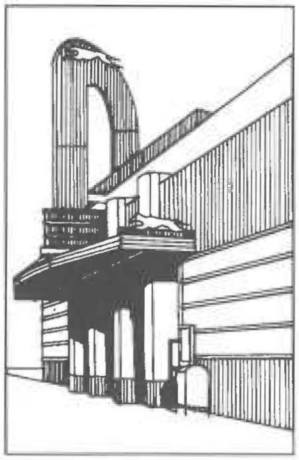

Additional Readings

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Hedrich-Blessing

Hedrich-Blessing

860-880 Lake Shore Drive (far left) is on the National Register; Inland Steel is not. Neither has received local landmark designation.

Underage Landmarks

Susan Benjamin

There is a new species of endangered buildings: those less than 50 years old. As land values continue to escalate, larger structures will surely replace buildings of the 1930s, '40s, '50s, and '60s as they have those of the late-19th and early-20th centuries.

It seems inconceivable that the jewels of modern architecture would be destroyed. We take the existence of Ludwig Mies van der Rohe's Crown Hall (1957) at IIT in Chicago and Skidmore, Owings & Merrill's Inland Steel (1957) for granted. But what if Crown Hall were no longer functional? What if Inland Steel, only 19 stories and on valuable Loop property in Chicago, were no longer economically viable? Demolishing SOM's Lever House (1952) in New York was very much a possibility a few years ago. It didn't happen because influential people like Philip Johnson, Jacqueline Kennedy Onassis, and Truman Capote—as well as preservation groups—got behind the effort to save it. There is currently considerable publicity over proposed additions to Frank Lloyd Wright's Guggenheim Museum (1956) and Marcel Breuer's Whitney Museum (1966). On these the jury is still out.

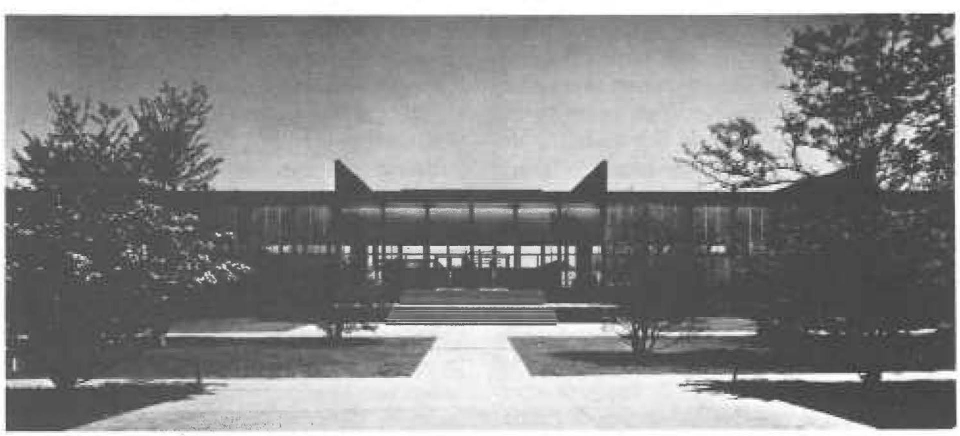
In the Chicago area, the problem of preserving structures that are less than 50 does not seem to be acute—yet. But it must be acknowledged that there is a problem. Already quietly lost was the Hillel Foundation (1952) at Northwestern University in Evanston designed by Harrison and Abramovitz, the firm that designed the United Nations building in New York. It was a handsome example of early 1950s design and was replaced by some unremarkable townhouses. In Champaign, Illinois, Paul Rudolph's Christian Science Building (1962) was a recent tragic loss (see *Inland Architect*, March/April 1987.) Unnoticed by most, newer structures of lesser importance, publicly and privately owned, are being remodeled or torn down. We continue to ignore our history and destroy our architectural heritage at an astounding rate.

What to do about these underage buildings? Getting landmark status is a positive first step that establishes a building's historic and architectural significance while calling attention to its importance. This sounds simple enough, but in truth, designating more recently-designed buildings as landmarks may require a whole new way of thinking. The public in general and preservationists in particular rarely think of newer buildings as potential landmarks. Under many landmark ordinances buildings must be a specified number of years old even to be considered for landmark status. Happily, Chicago's ordinance does not have that provision. Yet, the city's designating body, the Commission on Chicago Landmarks, generally has shown little interest in looking at buildings designed within the last 30 or 40 years. Except for those that fall inside historic district boundaries, there are no locally-designated Chicago landmarks less than 50 years old. Ten years ago the commission recommended designation of Mies van der Rohe's 860-880 Lake Shore Drive. Approval has been pending before the City Council since 1980.

Although placing a property on the National Register of Historic Places does not prevent demolition it is still a good place to start. The register is the most widely-recognized, well-respected, and apolitical landmarking process. To those not too jaded, it conveys real status. Established in 1966, the register is the nation's authoritative list of historical and cultural resources deemed worthy of preservation. Currently, it contains 48,000 properties—some of which are entire historic districts.

Getting a structure that is less than 50 listed on the register can be almost as difficult as acquiring Chicago landmark designation. In Illinois, only 13 of the more than 900 places on the register were added when they were less than 50. These include 860-880 Lake Shore Drive (1949–51); the Compana Factory in Batavia (1937) by Frank Chase; Frank Lloyd Wright's Usonian Lloyd Lewis House in Libertyville (1940); the Baha'i Temple in Wilmette (1921–32) by Louis Bourgeois; and the Site of the First Self Sustaining Chain Nuclear Reaction at the University of Chicago (1942). "Young" properties such as these must prove to have exceptional significance even to be considered.

For a sense of the rigors of the process, consider the Paul Schweikher House and Studio, a property of exceptional significance in suburban Schaumburg, that was added to the register February 17, 1987. Built in 1938, the Schweikher property represents a superb synthesis of Prairie School and In-

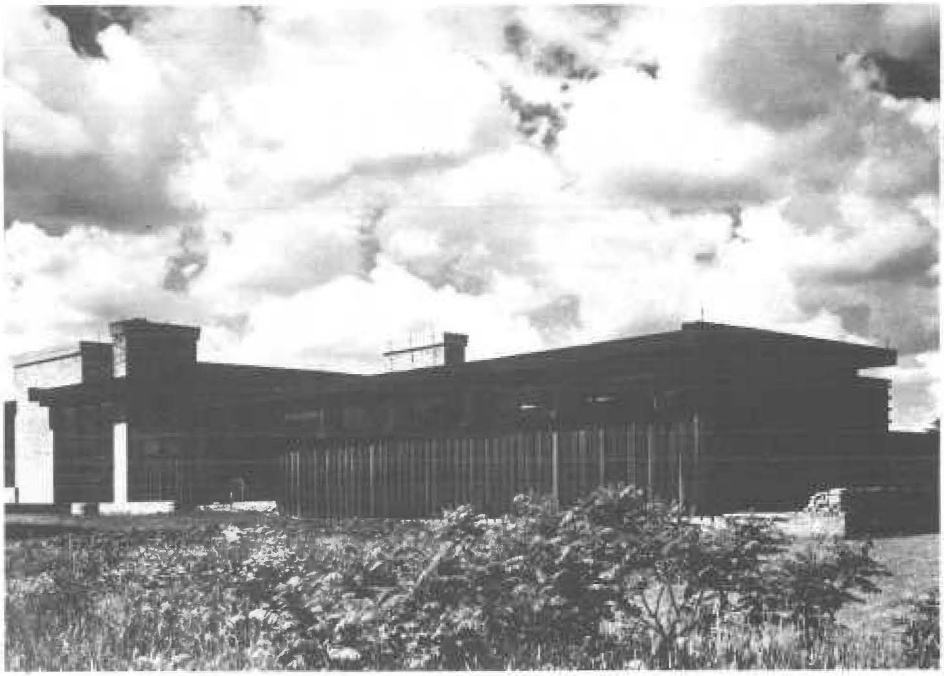


The IIT campus is now on the working list of the National Register.

ternational Style design features. Although Schweikher's name is not a household word, the 83-year-old architect has won several design awards, chaired the departments of architecture at Carnegie Mellon and Yale, and seen his work widely published (see *Inland Architect*, November/December 1984). His studio trained such notables as Bertrand Goldberg, Edward Dart, and Ralph Rapson. Proving the Schweikher House possessed "exceptional" significance required considerable effort because the house lacks much published acknowledgment other than an article in the 1947 *Architectural Forum*. No one has yet published a book either on Schweikher or on residential architecture of the post-prairie period. Happily, the Art Institute of Chicago's drawing collection turned up several studies and working drawings for the house. Biographical notes from Paul Schweikher provided lists of exhibits and publications which could then be researched in the institute's architecture library. Added to this material were many letters of support from scholars all over the country that truly established the case for "exceptional significance." By praising Schweikher's work, addressing the importance and influence of his home and studio, and encouraging its preservation through nomination to the register, the letters set the context in which the building could be evaluated. They added the human component of critical evaluation to the documented research. Letters came from such admirers as Peter Blake, William Jordy, Rapson, Goldberg, and William Bruder, who is writing a book on Schweikher. As a result of this and more, the vote to recommend listing on the register by the Illinois Historic Sites Advisory Council was unanimous.

Today the Schweikher House needs the recognition register listing affords. Once surrounded by farmland, it is presently located on a two-and-a-half acre peninsula in the midst of 300 partially-wooded acres of land owned by the Metropolitan Sanitary District (MSD). In an attempt to rid its land (which contains a water purification plant) of any intrusions, the MSD filed for condemnation. This could have proceeded with barely a whimper. But because the property is listed, it has the status it deserves and preservation is being honestly considered by the MSD.

Because of its youth, proving the "exceptional" significance of the Schweikher House raised questions not easily answered. How important is historical perspective? Why is proving exceptional significance critical? What is meant by "exceptional?" What are the special issues specific to those International Style, moderne, and post-prairie buildings constructed in the 1940s, '50s, and



The Prairie School influence is evident in the recently-designated Schweikher House and Studio.

'60s? Are these indeed vulnerable?

The issue of historical perspective is particularly thorny. The register is, after all, the register of *historic* places. According to "How to Evaluate and Nominate Potential National Register Properties that have Achieved Significance Within the Last Fifty Years," a seven-page guideline published by the Department of the Interior, "The passage of some time is necessary in order to apply the adjective 'historic' and to ensure adequate perspective.... [It] allows our perceptions to be influenced by education, the judgments of previous decades and the dispassion of distance." Carol Shull, chief of registration for the National Register, considers historical perspective very important. She underscores the need for an historical context to look at properties in an unbiased way. "As people begin to document and understand, we're able to evaluate them more reliably as historic places."

This is good news and bad news. The good news is that such a reliable historic evaluation, a really comprehensive scholarly documentation, offers credibility; the bad news is that it takes time, and during that time important buildings will be lost.

How do you separate history from current events? The "How to" explains, by proving "exceptional" significance. "That principle serves as a safeguard against listing properties of contemporary, faddish value and ensures that the Register will be a Register of Historic Places." But exceptional is difficult to define. In fact, it's not defined in the criteria, there are only guidelines and examples. For National Register purposes a property of exceptional significance is generally considered to be influential, innovative, unique, or a first. For instance, the Compana Factory is architecturally significant as a superb example of the Bauhaus and Art Deco styles applied to an industrial building and is historically important for its innovations in manufacturing technology. Mies's 860-880 Lake Shore Drive buildings were, according to the landmark nomination report, the first of the glass and steel curtain wall buildings and became prototypes for the skyscrapers that make up a significant, even ubiquitous, portion of today's environment. But, as the guidelines suggest, "exceptional significance" does not necessarily mean national significance. A structure can be of regional, state, or local importance. Also, a building type may be of exceptional significance in one community because of its rarity and not in another. Exceptional significance may be established through professional recognition. Eero Saarinen's Dulles Airport (1963) was considered exceptional because, in 1976, members of the AIA voted it the third most significant building of the nation's first 200 years. Clearly, defining exceptional and applying the term to potential National Register properties is like picking around and pulling from a grab bag.

Although the threat of demolition frequently sets the National Register process in motion, it is really not supposed to be a part of the discussion. Carol Shull says, "The fact that a building is threatened plays a relatively small role. Using that as a criteria [for listing] would jeopardize the program. You still have to go back to the question of exceptional significance." The rules always reach toward an overriding historical objectivity. Reality tells us, however, that the threat of loss is very compelling when a building is being considered for National

Register nomination by the Illinois Historic Sites Advisory Council. The council cannot help but be aware of the impact its decision could have.

There is another variable in considering buildings for listing on the National Register—tax credits. Economic incentives are seldom mentioned when buildings are being evaluated, but they too are a reality. Although tax laws are not as favorable to preservation as they once were, owners and developers often seek designation to get the available tax credits for rehabilitation. Ironically, the very tax laws that have done so much to encourage preservation make government officials in the field of preservation wary of being too liberal in encouraging landmark status. Keith Sculle, National Register coordinator for the Illinois Historic Preservation Agency, underscores this. "Especially in light of the tax incentives available with National Register listing, the public, not just preservationists, has to be convinced that special advantages are justifiable."

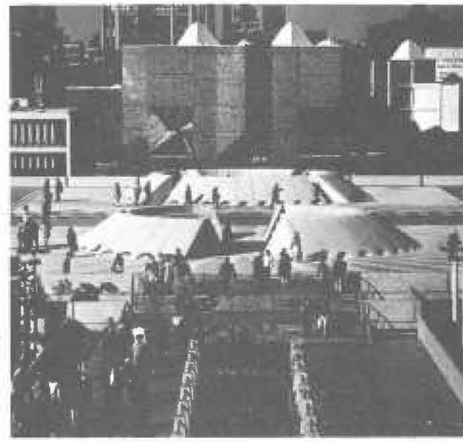
Ignorance, priority, and complacency are three persistent problems that emerge in considering, evaluating, and protecting our more youthful landmarks.

Ignorance: There isn't always literature available evaluating recently-built structures in a larger context. This is also a problem, Sculle notes, in the understanding of vernacular buildings, properties of local significance, and the work of lesser-known architects. Mies's career has been documented; Schweikher's has not. From scanty materials, Schweikher's House and Studio had to be evaluated in relation to his other work as well as the architecture of the period for its nomination to the register. Lack of information is a critical problem with lesser-known buildings by well-known architects, too. SOM's Inland Steel Building is well documented, the Home Federal Savings and Loan (1961) at the southeast corner of State and Adams, the last of the Miesian curtain wall buildings built in the Loop, is not.

Priority: Older properties are inevitably looked at first. "There is so much out there," says Joan Pomeranc, project coordinator for the Chicago Landmarks Commission. With so many buildings to evaluate it is easy to overlook the newer ones worthy of protection. There is rumor, she noted, that the Morton Building, 110 North Wacker, (Graham, Anderson, Probst and White, 1958) may be endangered. But no one is considering designation of any sort. Chicago's commission, however, is awakening to the need for reviewing recently-designed structures. The IIT campus appears on its work list. This marks a beginning. It is unfortunate that the cutoff date for the commission's comprehensive building survey—now 50 percent completed—is 1940. Such structures as Inland Steel, the Kraft Cheese Company building by Mundie, Jensen, Bourke & Havens (1939) at 500 Peshtigo Court, Mies van der Rohe's Promontory Apartments (1947) at 5530 South Shore Drive, the University of Chicago Law School Building by Eero Saarinen (1960), and others like them will be overlooked. Architectural historians should be assessing the work of Keck and Keck, Harry Weese, Perkins & Will, Edward Dart, Bertrand Goldberg, and others. This would but scratch the surface.

Hedrich-Blessing

The University of Illinois at Chicago campus (left and below) is a rare and complete brutalist composition.

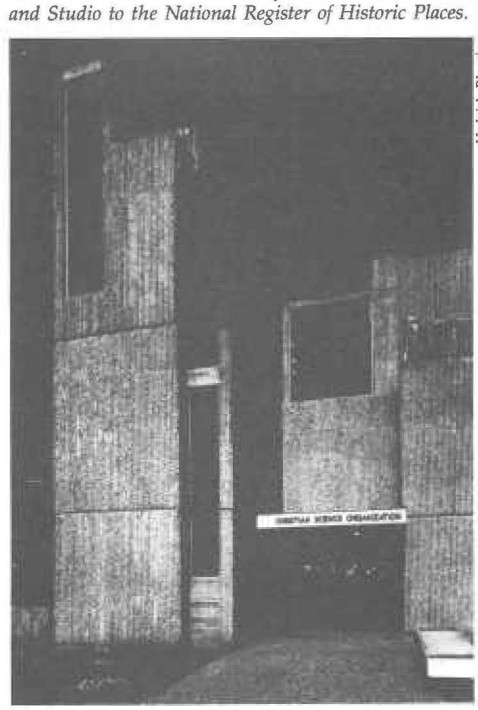


Hedrich-Blessing

Complacency: It has been easy to sit by and overlook some losses; there could be repeat performances. The University of Illinois, Chicago Circle Campus (SOM, 1963–68), a fine example of 1960s brutalist architecture, has buildings sorely in need of repair. Brutalism is a style that has not received much scholarly attention and is currently not popular. Will the stylistic integrity of the campus be respected, or will it be remodelled quickly and cheaply to suit current tastes, or, worse yet, without any taste?

There are no *easy* answers, but there are ways to preserve our newer architectural gems. One method would be to promote preservation programs that focus on buildings less than 50 years old. A similar approach has been used by the National Trust in its rural preservation efforts, like "Barn Again," and by the State Historic Preservation Agency in its cemetery survey. An important consequence of the trust's work was that it forced the preservation community to define what is of value in the rural landscape. A second and vitally important method is to encourage articles, books, and lectures on these buildings. Any public awareness efforts are of use if one important fact is taught: through every indiscriminate act of demolition we erode the rich texture of our architectural environment, and older "new" buildings are an important part of that environment. The third method is landmarking. With nominations to the National Register and with local designation come a wealth of documentation and recognition. Let's not allow buildings like the U.S. Gypsum Building by Perkins & Will (1963), or the Seventeenth Church of Christ, Scientist by Harry Weese and Associates (1968) to fall through the cracks and be lost. It is time for us to focus our attention on these younger landmarks before they are gone.◆

Susan Benjamin is an architectural historian. She wrote and researched the nomination of the Schweikher House and Studio to the National Register of Historic Places.



Hedrich-Blessing

Paul Rudolph's Christian Science Building was demolished in 1986.

Yvonne Lee ponders on
the appropriate criteria for
judging modern architecture

THE DILEMMA OF 'LISTING' MODERN BUILDINGS

Everyone is familiar with the concept of preserving the old and beloved mediaeval cathedral, and to a lesser extent the eccentricities of the Victorian age, but what of 'modern architecture' and the problems that its preservation brings? For example:

- should modern buildings be protected in a manner comparable to old buildings?
- are modern buildings worthy of retention?
- how is a perspective to be gained in a subject that is prey to aesthetic and personal judgement?

A concern for the conservation of the built environment is not a modern phenomenon; for example, in 1715 Nicholas Hawksmoor was advocating conservation based upon the philosophy of custodianship; a concept taken up by William Morris over 150 years later. Morris believed that the custodianship by the present generation of the architecture of the past was important not least as evidence of the needs and aspirations of ordinary people, and his conviction was that a vernacular architecture of the future could only develop by the study of the forms and techniques of the past.

Individuals such as Hawksmoor and Morris were eloquently expressing the views shared by many people and were undoubtedly outlets for current public opinion. So-called classes of preservable buildings have all attracted varying degrees of reference and action to preserve, for example Society of Antiquaries, SPAB and the Victorian Society. All these organisations were conceived in a surge of emotional reaction against what was seen as ignorant destruction.

While popular opinion has spawned many reputable conservation-oriented lobbies it must none-the-less be concluded that current popular taste, or fashion, is a poor guide to how and which particular buildings should be preserved. This is particularly true of 20th century architecture which has come to mean all things to all men. In asking for people's views as to good examples of the period, one should not be surprised to receive a diversity of views, from Le Corbusier to the high-tech of Rogers and Foster. If fashionable tastes had been allowed to prevail, so-called monstrosities such as St Pancras Station and Hotel would have been demolished without a murmur in the 1950s.

It is undoubtedly public opinion that has led and legislation followed in the sphere of conservation and preservation. The first principles governing conservation in this country today undoubtedly flow from this concept of custodianship and the need to protect the built environment or at least key parts of it for future generations; this esoteric philosophy which makes conservation such an emotive subject has been taken up and accepted by the legislator, currently culminating in the 1990 Act and the newly published *PPG15*.

PPG15 provides valuable advice on the listing of buildings and in particular the criteria used to assess such buildings. Unfortunately, the guidance still remains locked into a time perspective, with the age of the building remaining all-important. Architecture through time within the parameters of current legislation and guidance is not viewed in a balanced or objective manner. The emphasis, whether intentional or otherwise, remains firmly with 'old' buildings.

But if one accepts the principle of custodianship as the guiding philosophy in the conservation of our built heritage, then modern architecture must be considered for retention and protection in a manner which respects its very peculiar needs. It is recognised that this will not be an easy task. Undoubtedly modern architecture, and in particular post 1945 architecture, has been a period of great creativity and of major building opportunities:

- no preceding period has seen such diversity of style;
- the range of building types as well as styles has greatly altered and widened, eg high-tech industrial, leisure, new concepts in retail development, and major engineering projects;
- many immediate post war buildings were built to very tight budgets using inexpensive materials and employing experimental techniques, thus giving rise to issues of quality and the high maintenance cost liability;
- many post-war buildings were constructed as a series rather than individually.

The issue then becomes how best this protection and preservation can be achieved, and the question to be answered is: where do we go from here?

I would suggest that there is a need for greater public understanding and appreciation of modern architecture. This does not mean to say that suddenly the 1960s tower block should be rehabilitated back into society. Rather a wider awareness of architecture is required which, for example, appreciates the technological innovations and inventiveness in the use of materials. This would encourage objectivity to enter into the debate. I also believe that clearer guidelines for protecting the best of our modern heritage need to be established. The present system is a good starting point but it is inadequate. Further guidance is needed not only on the criteria for listing buildings (which in part has been addressed in *PPG15* and in the work currently being undertaken by English Heritage in the identification of exemplar buildings), but also positive recognition needs to be given to the need to allow modern buildings, in particular, to evolve. If we are to leave original, interesting and adventurous architecture of the 20th century to future generations, the paradox is that we must not be over zealous in its infancy. Fundamentally, we need to ensure that the system retains a good perspective and, wherever possible,

objectivity.

In dealing with modern buildings we need to move away from the rigidity and secretiveness of the existing system, and to be more flexible and open. It is also of fundamental importance to allow a building to evolve. Very often today commercial buildings, for example, are completed to a very rigid specification and brief imposed by the client, only to find shortly after completion that the building has teething problems. In addition, the increasing pace of technological change affecting organisations; for example, changes in computer technology and office layout and practices create the need for earlier adaptation than was previously the case.

Readers will be familiar with the concept of a Section 106 Agreement (a legal contract between an LPA/owner/developer, to protect those matters which cannot adequately be protected or provided for under planning conditions). A Section 106 Agreement often provides for such matters as historic landscapes which could be adversely affected by proposed development and to which it is considered appropriate to provide ongoing protection.

It is contended that this concept could be developed into a 'Conservation Management Agreement' (CMA) for the protection of outstanding examples of modern architecture, although this would not be tied to an individual planning permission, nor could it ever supersede the need for planning permission, but it would be tied to an individual building.

It is suggested that a CMA would only apply to buildings recognised as being of potential architectural and historic importance, I use the word potential to emphasis the need to allow for a period of time to elapse to allow for objectivity and perspective on such decisions, but which are of 30 years of age or less. (I have proposed 30 years in line with the current 30 year rolling programme.) It would be upon buildings of this period that the current rigid listing process impacts the hardest, thus severely inhibiting what must be viewed as the buildings natural evolutionary period. Thirty years would provide a sufficient period for contemplation to ensure adequate objectivity and release from prejudice of current fads and fashions.

The introduction of such a mechanism would go a long way to over coming the secrecy of the current system. The owner/occupier would be approached and made aware of the perceived importance of his building. The choice of a CMA or a statutory listing could be offered; the need to retain the back-up measure of statutory listing needs to remain because throughout it must be the protection and preservation of the building which remains of paramount importance.

It is proposed that a CMA should include:

• a full recorded documentation of the building including copies of original brief and working drawings, amendments made during the course of construction, subsequent amendments/modifications made, and photographic record of the building as at date of agreement;
• an appraisal of the key features/characteristics of the building and identification of the parameters for substantial alterations;
• local planning authorities to be kept fully informed of all alterations made to the building and records updated accordingly;
• CMA would not obviate the need for planning permission, but it would, of course, remove the need for listed building consent as the building would not be listed;
• the CMA would run for 30 years with reviews every 10 years.

The advantages of a CMA would be:

• it avoids the rigidity of the existing system and explicitly recognises the need for the buildings to be allowed to evolve, particularly in their early years;
• it encourages openness in the debate surrounding the protection and preservation of the built environment;
• an increase in the involvement of the process with the owner/occupier would increase awareness and understanding, and encourage a more sympathetic approach to proposed alterations and works generally;
• full documentation on the building would be available to allow for informed decisions to be made upon review as to whether statutory listing should be invoked. This of itself would also provide a valuable historic record of the building;
• it would allow for a period of natural evolution at some artificial break point, ie the date of listing, by being less restrictive and more open would encourage greater public support of conservation and its aspirations.

It is recognised that such a 'voluntary' arrangement may not be appropriate in all circumstances and thus the advocacy of a 'carrot and stick' approach, an owner/occupier should be offered the option of CMA or a statutory listing: any breach of a CMA to prompt immediate review with the possibility of statutory listing. It is acknowledged that a CMA could not override the need to obtain planning permission in the normal way, but it is recommended that the existence of a CMA should be a material consideration in any decision on a planning application. By way of additional protection, with the exception of a single residential unit, planning permission would be required for demolition, so the building would remain protected from total loss. In addition, in dire circumstances the local authority would retain its powers to issue a Building Preservation Notice if it were considered that the building was in severe risk.

Yvonne S Lee BSc(Hons) DipBldgCons ARICS has recently moved from the private sector to become Conservation Officer for Dacorum Borough Council. Her views are entirely personal and should not be taken to reflect the opinion of the Borough Council.

9 Afterword: Industrial Buildings and Conservation

ALAN POWERS

We have travelled a long way since the first issue of the *Thirties Society Journal* in 1980 opened with Simon Jenkins's article 'The Anger of Firestone', explaining the circumstances surrounding the demolition of that great factory building over August Bank Holiday weekend, when it was within a few hours of being listed. The contrast is seen at its greatest at the Hoover Factory, which reopened in October 1992 as a Tesco store, beautifully restored and appropriately altered for its new use. In this journal, Joan Skinner's article tells us more than we then knew about what was lost. There is still no consensus on the conservation of inter-war factory buildings, even in the long-suffering Great West Road. At the time of writing, there is an application to demolish the listed Beechams Factory by Wallis, Gilbert and Partners on the opposite side of the road, which the Twentieth Century Society is opposing.

The changes in British industry since 1980 have been damaging to its buildings as to so much else. This is the period that has seen the redundancy of most of the pre-war power stations and many post-war ones. Battersea, which should have been the best demonstration of how to transform a much-loved symbol of industry is still languishing in uncertainty. Dunston B, the remarkable Gateshead power station with its great curtain wall of glass, about which Bob Jarvis wrote in *Thirties Society Journal* 3, fell to the demolition squad in 1986. Waddon Marsh Power Station at Croydon, a work of 1946 by Robert Atkinson in the Giles Gilbert Scott style, was demolished over a weekend when the owner suspected that it might be listed. Now, Bankside, the last great work by Scott, although refused listing on blatantly political grounds, has been chosen by the Tate Gallery as its Museum of Modern Art and has a brilliant future ahead. Location which made it a victim in a time of economic prosperity has saved it during recession.

Listing has helped to retain a few factory buildings, although the Wallis, Gilbert India of Inchinnon remains derelict in a wasteland outside Glasgow, and the Luma Light factory in Glasgow finally had to be abandoned when no new use could be found for it. Of the buildings discussed in this journal, the Pilkington offices by Herbert Rowse have been threatened by demolition several times in the last decade, and their future remains uncertain. The post-war Pilkington offices by Fry and Drew which replaced Rowse's building are also empty, and the Cummins Engine Company building by Roche and Dinkeloo is mothballed by its owners, having been spot-listed grade II*. Its companion in the use of Cor-Ten steel, the Wills Factory and Offices at Hartcliffe by SOM and Yorke Rosenberg Mardall is empty and offered for redevelopment, as yet unlisted.

On the credit side, the Owen Williams 'Wets' building at Beeston for Boots (D10), probably the grandest and historically most important inter-war industrial structure, is being carefully restored while remaining in use.

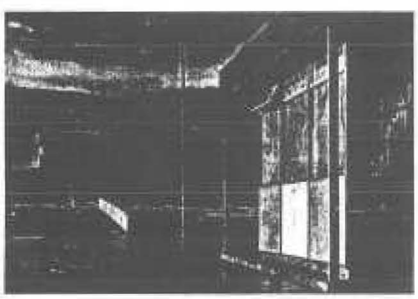
Any attempt to preserve more than a handful of industrial structures in defiance of economics and location would be foolish, yet we may still take them more for granted than will future generations. The pattern of industrial building, as surveyed by Edward Mills, now militates against finely-designed purpose made

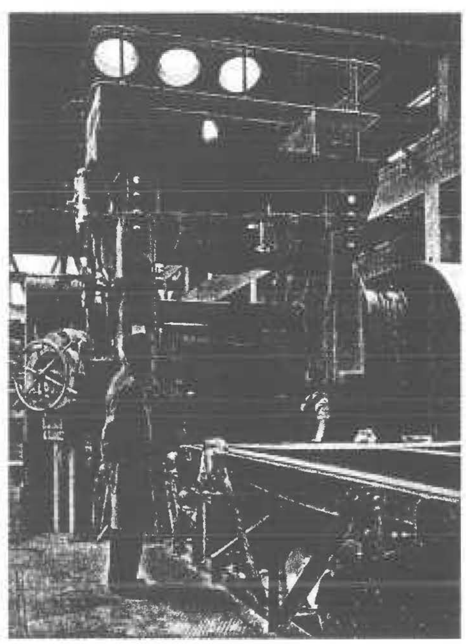
opposite
Bankside Power Station, Southwark. Sir Giles Gilbert Scott with Mott, Hay & Anderson, Engineers, 1957-60. *(English Heritage)*

buildings of the type that Firestone pioneered, and firms such as Reliance Controls and Inmos perpetuated, where the company invests in architecture as part of its projection of image. Unless a new generation of industrial buildings arises, we may have seen the completion of an architectural cycle peculiar to the middle of the twentieth century. The idea of the company town or village, exemplified at Kirk Sandall and East Tilbury, is even more remote from present experience.

It is for this reason that the conservation of twentieth century industrial buildings has taken on an added urgency since the beginning of the 1980s. They are falling into obsolescence with greater rapidity, and new industries will not emerge to fill them. The buildings themselves are less easily subdivided than Victorian industrial buildings, and their experimental structures add a further element of uncertainty. The cycle of obsolescence is now so short as to recreate within one generation the unemployment that industry was expected to cure. The problems are seen most acutely at Brynmawr, Gwent, where the Thirties Society first campaigned to save the 1946–51 Rubber Factory, designed by Architects Co-Partnership, from demolition in 1986. An application to demolish was overturned at a public inquiry, since CADW, with exceptional boldness, had listed the building Grade II*. The factory was originally sited in the town to relieve its severe unemployment, and its combination of architectural quality and socially-aware design symbolised the post-war realisation of pre-war dreams of effective help for 'special areas'. The very scale of the vision which produced the factory has dogged the pursuit of a solution to its reuse. The local economy cannot sustain so large a building in a single use, and economic motive is lacking for a single developer to take in hand its subdivision. The factory remains today as a building of great beauty and great social potential, but it requires another infusion of the public funding which originally made it possible to build.

A case which the Twentieth Century Society fought in 1992–93 over the Gilbeys Offices, Warehouse and Bottling Plant in Harlow New Town showed a different set of problems. The listing was requested by the society early in 1992. A planning enquiry, at which Julian Holder appeared, recommended the retention of the building rather than its redevelopment by Sainsbury's (although not for historic buildings reasons), but the Secretary of State for Environment





allowed the application on appeal. Demolition had already begun in September 1992 when the listing was confirmed, and several tense months followed, during which the Society, with the help of Peter Eley, demonstrated that the building was easily convertible to the proposed new use.

The advantage would have been to preserve a greater mixture of uses on the site, as well as retaining one of Harlow's most notable industrial structures, with its local character and fine landscaping. Although the Department of National Heritage resisted attempts to have the building de-listed, English Heritage commissioners decided not to offer any objections to a demolition application, leaving the Society and Essex County Council in a weak position. The building was the centre of a complex local debate, mainly against the idea of a superstore on the site, and less interested in the preservation of Harlow's built fabric. The practical outcome was that Sainsbury's made a slightly greater effort in the design of the new building, and were granted consent without having to submit to another public enquiry. The Gilbeys building has now been demolished.

For those who feel that listing only preserves useless buildings in the face of economic reality, the Gilbeys story offers the comfort that demolition may still be the outcome of listing. At the basis of the argument for demolition was the feeling that the building was too recent to be listed, despite its qualification under the 'Thirty year rule'. After this preliminary skirmish, it is to be hoped that the industrial buildings recommended for listing by English Heritage as part of its detailed study of post-war building types will be lost less easily. In five years' time, Gilbey's would probably not be let go so easily, and its loss may be more widely regretted. At the same time, more research on inter-war listings of all kinds is urgently needed, so that buildings of the importance of the unlisted Aiton Factory are not overlooked any longer. It was ironic that Gilbey's fate was decided in the same year that Hoover was so triumphantly reopened by Tesco, an outcome which in 1980 was hardly imaginable.

John Timpson's account of the design of the Gilbey building, written for the Society's use during the campaign, makes an appropriate coda to this journal.

Brynmawr Rubber Factory
(Architects Co-Partnership with Ove Arup & Partners, 1946–51).

top left
The approach ramp was used by all factory workers and staff and symbolised a new era of industrial democracy.
(Architectural Press/de Burgh Galwey)

bottom left
The workers' clinic
(Architectural Press/de Burgh Galwey)

centre
Machinery in the Mill Room.
(Architectural Press/de Burgh Galwey)

right
The main factory floor deserted, July 1986.
(RCAM Wales)

Saving Face

PRESERVATION:
CURTAIN WALL RESTORATION

Repairing early cladding systems requires an understanding of their construction methods and materials.

PETER MAUSS / ESTO

Woolworth Building, 1913
New York City
Cass Gilbert

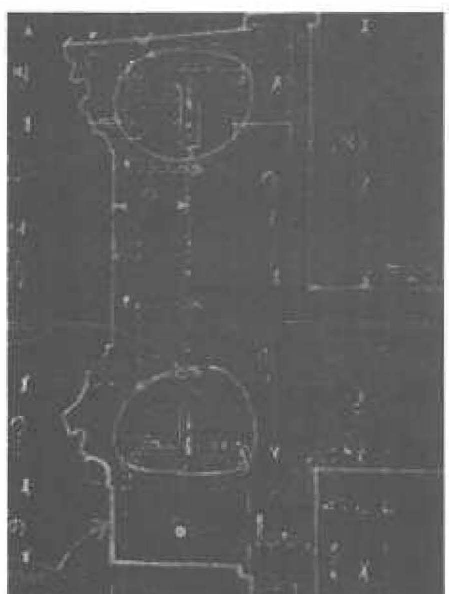
No relief joints were provided in the curtain wall of the Woolworth Building; terra cotta was supported directly on structural steel and backed with common brick. In the spandrel sections (far right), deterioration and subsequent cracking occurred because of corroded anchors and supporting steel. Since masonry was tightly packed against steel (right), only minimal corrosion was sufficient to cause cracking. In addition, the inadequate detailing of the window sill allowed moisture to penetrate through the joints at the top of the sill to the steel directly below. Not only was it necessary to replace the cracked sill units, but a full through-flashing was installed to protect the top flange of the steel beam.

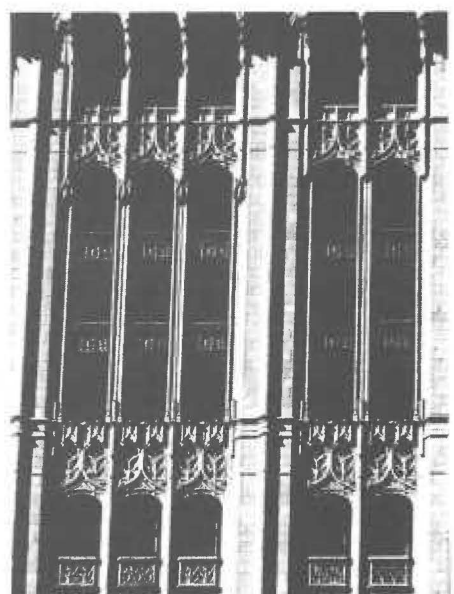
WHILE CONTEMPORARY CLADDING SYSTEMS are clearly understood, the origins and development of curtain wall technology are less familiar. With restoration work of these early curtain walls now being undertaken by firms across the country, it is important to develop an understanding of the terminology as well as the technology.

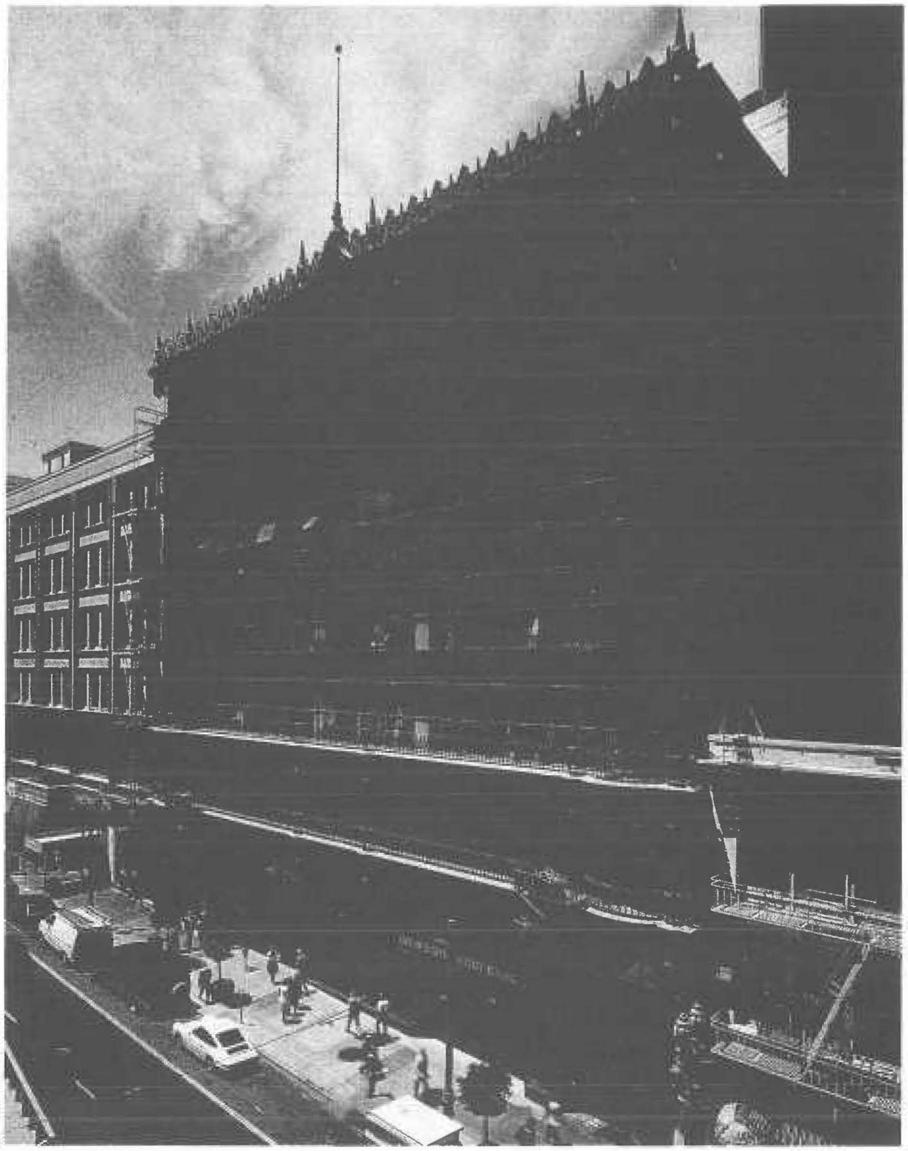
The technological concepts that formed the basis for early curtain walls of metal and glass were established by the end of the 19th century. The first generation of skyscrapers, however, was primarily clad in masonry—particularly terra cotta. In these early masonry towers, the structural frame remained incorporated into the exterior wall, although the cladding was supported on the frame independently, providing the "hung" characteristics of later metal and glass curtain walls. The turn-of-the-century preference for masonry was most likely driven by an ongoing concern for fireproofing. Vestiges of this concern are evident in the metal and glass walls constructed directly after World War II, wherein glass spandrel panels were frequently backed by masonry block walls.

This first generation of masonry-clad high-rise buildings is still evident in many downtowns. Examples range from D. H. Burnham & Company's 1895 Reliance Building in Chicago to the Cass Gilbert-designed Woolworth Building (1911-1913) in New York City. Glazed areas reached substantial dimensions in some of these early skyscrapers, as is evident in the McClurg Building in Chicago, designed by Holabird and Roche in 1899. While this building is often described as featuring one of the earliest curtain walls, the steel structural columns remain incorporated in the exterior wall masonry.

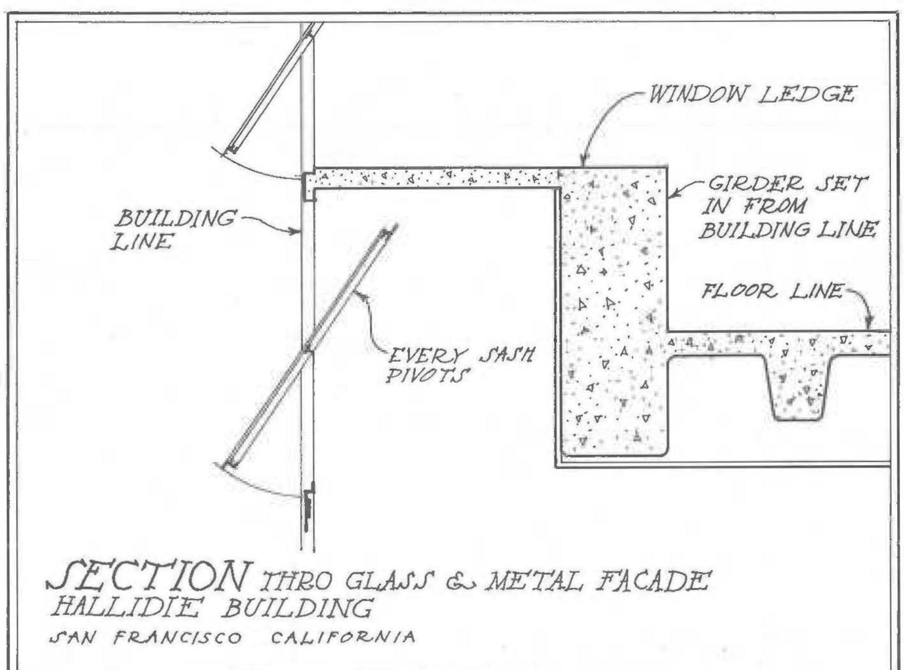
Glass and metal cladding in the second half of the 19th century found application mostly in low-rise structures such as the cast-iron fronts of commercial and industrial buildings. In the U.S., early commercial structures such as the recently restored Boley Building in Kansas City, designed in 1908 by Louis Curtiss, or the Hallidie Building in San Francisco, designed in 1917 by Willis Polk, exhibit a structural frame well set back from the glass and metal exterior wall. Glass and metal curtain walls did not, however, reach maturity until the 1940s and 1950s. The esthetic requirements of the Modern movement and the desire to simplify the construction process by eliminating the "wet trades" led to the abandonment of the earlier masonry curtain walls. Furthermore, industrial growth during World War II subsequently provided the necessary technology, manufacturing







RUSSELL ABRAHAM



capability, and marketing to make the technological developments possible.

Post-World War II curtain walls are represented by many well known architectural landmarks. The recently restored Equitable Building in Portland, Oregon, designed by Pietro Belluschi in 1948, is considered one of the earliest postwar curtain walls. Lever House, designed in 1952 by Skidmore, Owings & Merrill, and the 1954 Seagram Building by Ludwig Mies van der Rohe and Philip Johnson are other famous examples.

Typical construction

EARLY MASONRY CLADDINGS SHARE A number of distinct construction principles. Masonry was generally supported on a structural frame on a floor-to-floor basis by secondary structural members. However, proper shelf angles and expansion joints were not provided. The exterior wall had a thickness of 12 to 24 inches, consisting of a facing material and a backup system. The most common facing materials—terra cotta or glazed brick—were applied either separately or in combination. Common brick or structural clay block was connected to the facing by mechanical means such as metal anchors and keying of masonry units. Metal fasteners were painted or galvanized, and strips of flashing protected structural steel lintels or supports. The whole system relied on its redundancy for structural rigidity and watertightness. Glazed portions of these early curtain walls consisted of operable windows of substantial size, usually double hung, constructed of steel or Kalamein.

Pre-World War II claddings of metal and glass were generally assembled from industrial steel window systems, as in the Hallidie Building, or from a combination of cast-iron members and traditional window sashes, as in the Boley Building. As a result, these systems were limited in their spans of glass, and their inherent rigidity was sufficient to require no special measures for stiffening. The curtain wall systems constructed after 1945 generally fall within two types: either a panel or a grid system (also known as a "stick" system), differing in fabrication and installation methods.

Unlike earlier masonry claddings, curtain

Hallidie Building, 1917
San Francisco, California
Willis Polk

As an example of early curtain wall construction, the Hallidie Building (top left) offered maximum glazed areas and optimization of open floor area. The exterior wall is cantilevered out from a reinforced concrete frame by as much as three feet. The wall itself is constructed from a four-foot square, single-glazed steel industrial sash, with horizontally pivoted sections (left).

ED HERSHBERGER

ED HERSHBERGER

Commonwealth Building, 1948
Portland, Oregon
Pietro Belluschi

Originally known as the Equitable Building, the structure's curtain wall consists of insulated glass and aluminum panels mounted directly on a concrete frame and held in place by $2^1/_2$-by-$1^1/_2$-inch steel angles. Uninsulated spandrel panels and fasciae are constructed of $^1/_4$-inch cast aluminum and $^1/_8$-inch steel aluminum. Soderstrom Architects of Portland recently restored the lobby and inspection of the curtain wall revealed some cracked and broken glazing units that were replaced with similar glass.

walls of the 1940s and 1950s were often highly experimental in design. New, untested materials and systems were utilized. Typically, frames were constructed of steel, stainless steel, aluminum, or bronze. The transparent glass sections of these curtain walls featured both single and insulated glazing, while the opaque sections were made of colored wired glass, sheet metal (usually with some form of insulation, including porcelain enameled sheets), and stone.

During this period, jointing materials were also the subject of experimentation. Available caulkings and sealants were not always satisfactory since they had a lifespan of only three to five years. Newly developed sealants in the 1940s included polysulphides (also known as Thiokol) and gaskets of PVC or neoprene.

The design of the curtain wall system itself evolved through a great many variations. Most systems, called "face-sealed," were based on the principle of keeping moisture out altogether. The system relied on the wall being completely watertight with little or no water penetration. To control moisture infiltration and condensation, weepholes and flashing were provided at spandrel level. The principle of the so-called rainscreen, in which a cavity wall is employed to resist wind-driven rain, provided a primary and secondary system for preventing water entry. In addition, most of the earlier systems had little or no provision for separating the inside and outside of the metal mullions—no thermal breaks—to prevent internal condensation.

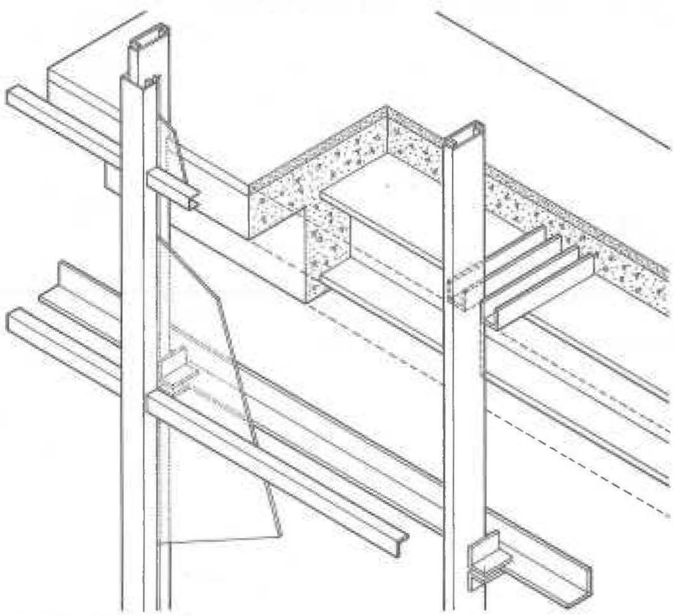
The structural requirements of curtain walls had to be quite different than those of earlier masonry claddings. While masonry claddings were inherently rigid, metal and glass walls required stiff mullions to eliminate unnecessary flexing or bending of the facade. Mullions were designed as either distinct vertical or horizontal elements on the exterior of the wall, or concealed behind the cladding. Rail or panel units were anchored to the structural system by concrete and steel, or by a system of steel connectors, clips, or brackets that allowed for adjustment due to structural shifts. Such mechanical fasteners allowed the curtain wall to be independent from the structural frame, thereby further shortening construction time. In addition, concrete block walls were frequently constructed behind opaque spandrel sections of the wall to meet fire codes.

Cladding investigations

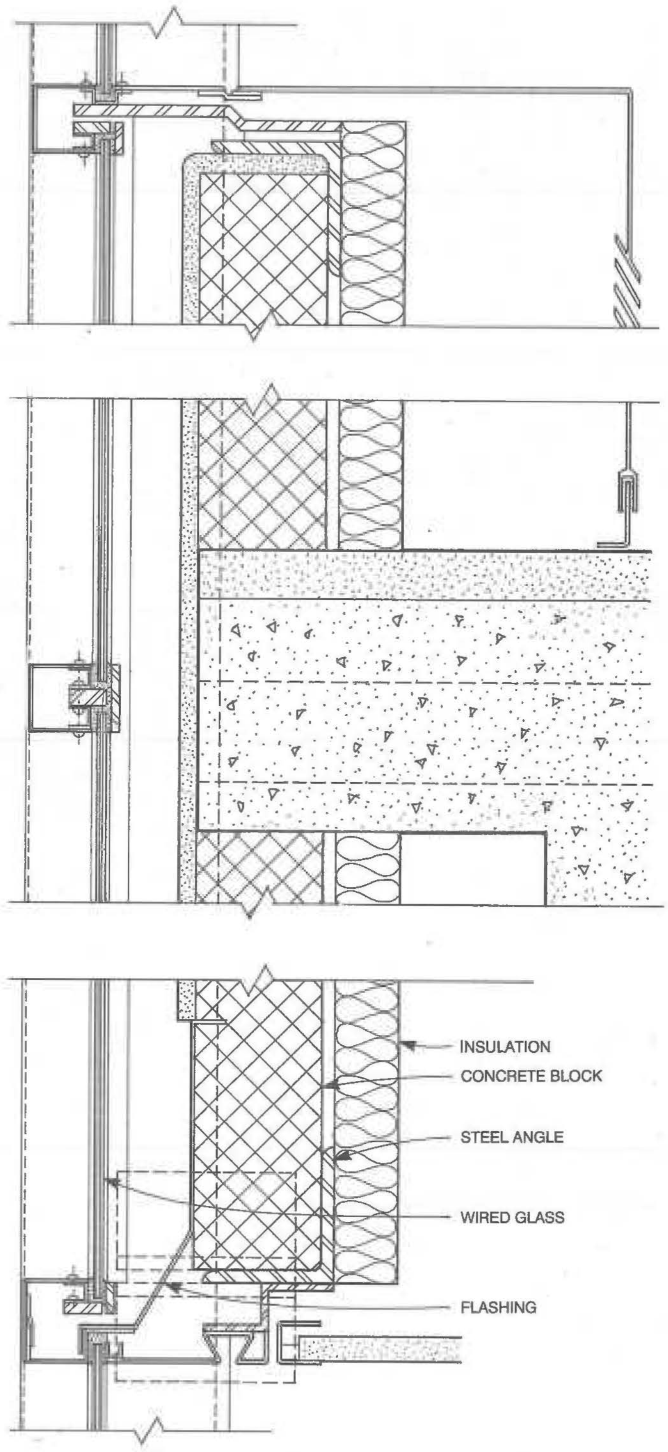
INVESTIGATIONS OF THE FAILURE OF EARLY curtain walls require a thorough study of surviving documentation as the first step in developing a comprehensive understanding of the problem. A detailed site investigation is the next step, to record conditions of the wall exterior for later retrieval and study. Failure of different components or materials should be noted. Generally, this will involve all signs of displacement, cracking, breaking of units and elements, or the opening of joints. Failures of particular elements, such as sealants, caulking, or pointing materials, should also be recorded. Documentation can be made both photographically and graphically. In addition to an exterior survey, interior conditions should be reviewed and all signs of failure or moisture infiltration should be included for correlation to outside conditions.

Where questions arise about specific causes or origins of the failures, additional investigations may be required to arrive at a proper assessment. These studies consist of two basic types: removal of selected sections to expose subsurface or otherwise concealed conditions; and testing of specific characteristics of materials and systems, including water and air infiltration and excessive pressures on the building skin. Specific materials should be removed for a more detailed analysis and assessment in the laboratory. The method of testing depends on the type of construction and failures to be investigated. All this information is necessary to assess the observed conditions and to arrive at effective

EZRA STOLLER / ESTO



DETAIL OF STEEL GRID



VERTICAL SECTION THROUGH SPANDREL SHOWING BACKUP WALL DETAIL

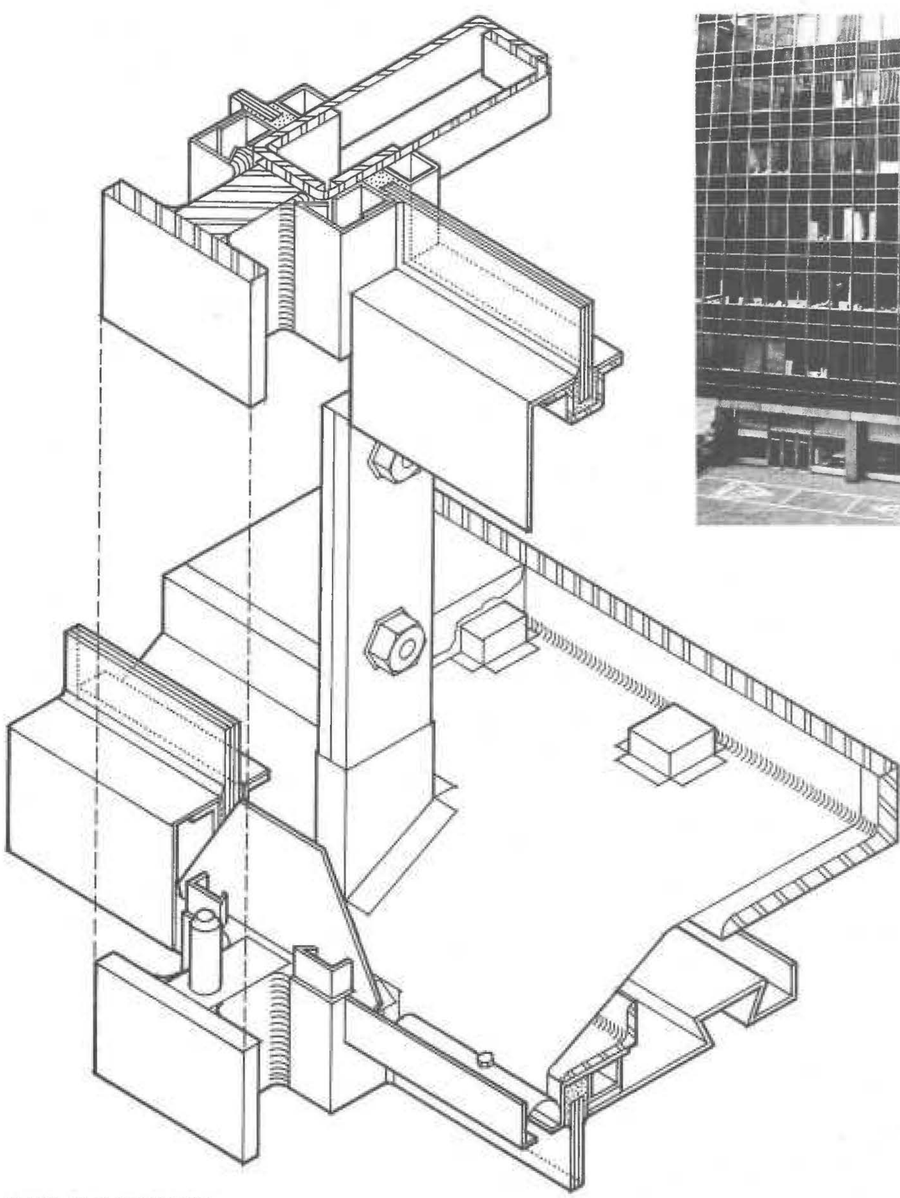
and cost-efficient repair solutions.

Once completed, the investigation should determine the specific causes of curtain wall failures. These failures may be attributed to a number of basic causes, including: movement, moisture infiltration, joint and sealant systems, and finishes.

External forces

MOVEMENT, PARTICULARLY WHERE THE structure is restrained, is a major cause of curtain wall failure. Structural movement can be caused by wind loading, substantial temperature changes, deflections of the structure itself, or excessive corrosion. Early masonry claddings were especially susceptible to movement because of the brittle nature of the masonry and the general lack of expansion joints. Masonry that is integrated into the structure and restrained by supporting members may develop vertical cracking or dislocation of wall sections because of extensive temperature differentials.

In addition to thermal stresses, fired clay materials like terra cotta expand because of moisture absorption. If the material is restrained, the expansion may cause considerable buildup of pressures in the exterior wall. The absence of expansion provisions will result in problems similar to those caused by temperature expansion. Where these stresses caused by both thermal and moisture expansion combine, the effects are even more severe and can result in cracking and failure of the individual units. Early terra cotta claddings, such as those used in the



DETAIL OF CURTAIN WALL

Lever House, 1952
New York City
Skidmore, Owings & Merrill

Lever House (facing page) provided the basis for a generation of curtain walls across the country. A vertical grid of double steel channels (facing page, bottom left) is secured between two steel sections welded to the top flange of the steel spandrel beam. The spandrel is faced with wired glass (facing page, right), in front of a backup wall of concrete block. The curtain wall is insulated on the inside face; the exterior is vented and flashed to drain out water. Extensive use of steel reinforcement and connectors (left) makes the wall susceptible to corrosion by moisture—particularly at the spandrel level where vertical mullions are attached to steel beams. Buildup of corrosion constricts the movement of the glass, causing breakage. As a result, some panels had to be replaced, as seen in the color variation of the spandrels (above).

Woolworth Building and in other skyscrapers of the period, have been known to experience such severe stress buildups.

The effect of wind loading on masonry cladding is usually minimal. Provided the structure itself is sufficiently rigid, masonry will not experience any significant movement or flexing because of its weight and thickness. The only wind-related damage may be wind-driven rain penetrating the structure, particularly at the window perimeters.

In buildings with metal and glass curtain walls, the effects of wind loading can be more severe. Early metal and glass enclosures have little or no expansion provisions, and because of their limited height, inadequate provisions originally did not present a major problem. However, a window wall that is insufficiently rigid will experience continuous flexing. This bending may cause breaking and failure of window seals and glazing systems. At worst, it may cause the entire wall to fail structurally.

Moisture infiltration

THE INFILTRATION OF MOISTURE IS ONE OF the major causes of failure in any sort of exterior cladding system. However, the causes and the impact of the failure will vary depending on the type of system. In most instances, moisture infiltration will be the result of the failure of joint or sealant systems.

Water entering early masonry facades may directly affect structural safety by corroding embedded metal anchors and supporting steel. The rusted metal will initially cause the facade masonry material to split and crack, allowing more moisture to enter; when sufficiently advanced, serious structural failures may occur. In addition, saturation of the masonry may eventually lead to further damage from freezing and thawing, and to coating failures.

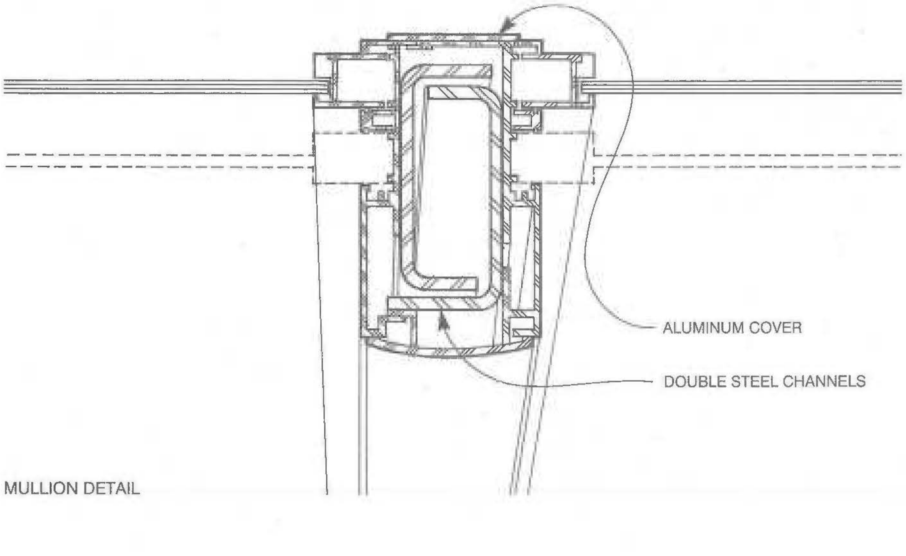
In some instances, serious damage may have occurred on the exterior even before interior finishes are affected. But when moisture penetration is noticed on interior finishes, the curtain wall failure can usually be explored before major structural damage occurs. Moisture entering the wall system may also affect the thermal performance of the spandrel panels by soaking the insulation.

Condensation is not commonly a problem in masonry claddings because of the thickness and thermal capacity of the wall. However, condensation may have serious effects on metal and glass curtain walls. Condensation may occur inside the wall system due to mullions that lack thermal breaks, are insufficiently insulated, or are single-glazed.

Failure of joint systems is the most common cause of moisture infiltration. In early masonry cladding, both mortar joints and joints around openings are at risk. Joint failure is most severe and immediate in metal and glass curtain walls. Early caulkings, sealants, or gaskets are particularly susceptible. The very nature of the materials—once predicted

U.N. Secretariat, 1947-1950
New York City
Wallace Harrison and Max Abramovitz

Designed in consultation with a board of international architects, the curtain wall of the United Nations Secretariat (above) is composed of structural steel channels as stiffening elements for vertical mullions, covered by aluminum sections (below). In addition, stiffening is provided by the introduction of aluminum sections that are either expressed on the exterior or recessed into the interior. This type of application is typical for later curtain wall designs when aluminum became the preferred metal. Like the design of Lever House, a block wall at the spandrel level was constructed behind the tempered, wired glass sections of the curtain wall. Unlike Lever House, however, the building features operable, double-hung windows of insulated glass (right).



MULLION DETAIL

to last as long as 50 years—makes them highly vulnerable to deterioration caused by temperature changes and ultraviolet light. Even a minimal failure will have far-reaching effects because of the lack of redundancy in most of the designs.

Finishes

EARLY MASONRY-CLAD EXTERIORS GENERally show signs of age in their accumulation of soil and dirt, even though cleaning these surfaces is a well accepted practice. In glazed brick or terra cotta claddings, the glaze may fail and scale off as a result of entrapped moisture and subsequent freezing and thawing. Preventing moisture penetration is the best way to deter further glaze deterioration.

Exposed metal mullions and opaque spandrel panels may show deterioration of their original finishes. The damage will depend on the metals, but will usually result from dirt accumulation and the resulting abrasions of the surface finish. Early stainless steel is relatively unaffected by atmospheric conditions and is easy to restore. Anodized aluminum finishes and porcelain enamel panels are more obviously affected, since the anodized surfaces may become etched and pitted by contaminants or improper cleaning. Porcelain enamel panels may develop rust on the steel substrate, causing the porcelain finish to fail. Ironically, the initial cause of damage is often caused by impact during repairs.

Panel repair and replacement

REPAIR OF EARLY CURTAIN WALL SYSTEMS can be divided into several categories following deterioration patterns. However, any repair must be combined with continued maintenance of the outside walls. In masonry-clad buildings, failed panels can be easily repaired or replaced. Where the existing panels can be salvaged, additional anchoring and ties may be necessary.

Where the panels cannot be retained, new units must be installed, and original materials or cast stone units are preferable. Depending on the configuration and structural function of the broken panels, substitute materials such as glass-fiber reinforced plastics or concrete, as well as metals, are commonly used. Special anchoring and support systems will also have to be designed, and weathering or performance characteristics must be considered carefully.

Before broken units are replaced, the underlying cause of the failure has to be corrected. Where failures are caused by corrosion of support or anchoring, the metals must be exposed and the rust removed. Where corrosion is too far advanced, the metal may have to be reinforced or replaced.

High stresses also need to be reduced before any other repairs are undertaken—

Continued on page 114

Curtain walls *from page 110*

particularly in cases where excessive stress contributed to the curtain wall failure. By making regularly spaced horizontal cuts in the masonry joints to the full depth of the cladding units, most of the pressure can be removed. The resulting cuts can be subsequently repointed with an appropriate mortar.

In metal and glass curtain walls, individual units are much more likely to fail. The metal will not break or crack, but distortion can affect the wall's weathertightness. Where this failure is the result of excessive flexing, reinforcement may be required.

Repairing joint systems

MOISTURE INFILTRATION IN MASONRY WALLS can be easily prevented by repointing masonry units on a regular basis. Where the damage is due to cracks or insufficient protection of horizontal surfaces, proper caulking or installation of additional flashing will offer adequate solutions.

In metal and glass curtain walls, moisture infiltration is a common occurrence and can usually be traced back to a failure in the joint systems. Partial dismantling of the wall to expose the sealant systems may be necessary to expose the failed sections; however, the precise approach will depend on the system used. A careful, ongoing repair program is the most effective deterrent.

Repairing finishes

TO REPAIR GLAZED MASONRY SURFACES, A localized application of a contemporary coating system is usually sufficient. Recoating the complete surface is ineffective and is likely to add additional and unnecessary maintenance. Original metal surfaces can also be restored. Anodized aluminum can be refinished by removing accumulated dirt and applying a clear finish. Painting such finishes is often ineffective—paint has only a limited lifespan and has to be part of an ongoing maintenance operation. Porcelain enamel must be spot-repaired by removing corrosion and applying an appropriate coating. As in the case of other glazed surfaces, complete coating of porcelain enamel is not usually necessary. Stainless steel surfaces can be repaired simply by rebuffing affected panels.

Maintenance procedures

ONGOING MAINTENANCE IS CRUCIAL TO THE continued life of curtain walls. Too often, curtain wall failures are more the result of deferred work than any design or material flaws. It costs more to correct failures than to implement a maintenance procedure, which should consist of detailed records, regular inspections, and maintenance schedules.

Upon completion of a substantial repair project, data and records of construction should be compiled in a logical format to facilitate future retrieval. This data should include as-built drawings, specifications, cut sheets, and product information. Records of project costs can be used in the future for preparing estimates of repairs.

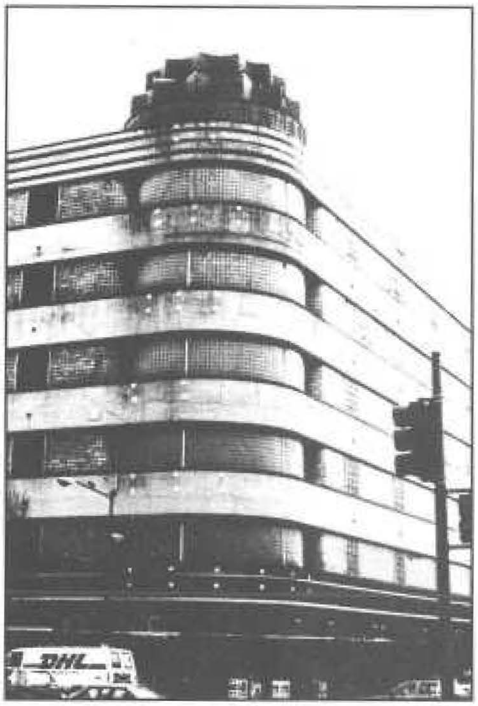
Periodic inspections are necessary to assess building conditions on an ongoing basis. The inspection should occur at regular intervals, and should follow a prescribed format. In addition, a maintenance schedule can be developed to track associated repair costs, which ultimately become an invaluable tool in budgeting for future work. By developing a comprehensive maintenance plan, the initial architectural investment can be protected so that a building's value can be extended well into the future. ■

—THEODORE H.M. PRUDON

Theodore Prudon, Ph.D., AIA, is the director of preservation at Swanke Hayden Connell in New York and teaches at Columbia University.

THE HECHT COMPANY WAREHOUSE

10,000 custom-fabricated glass block were a central element of the repair and restoration of this 1937 Washington, DC landmark.



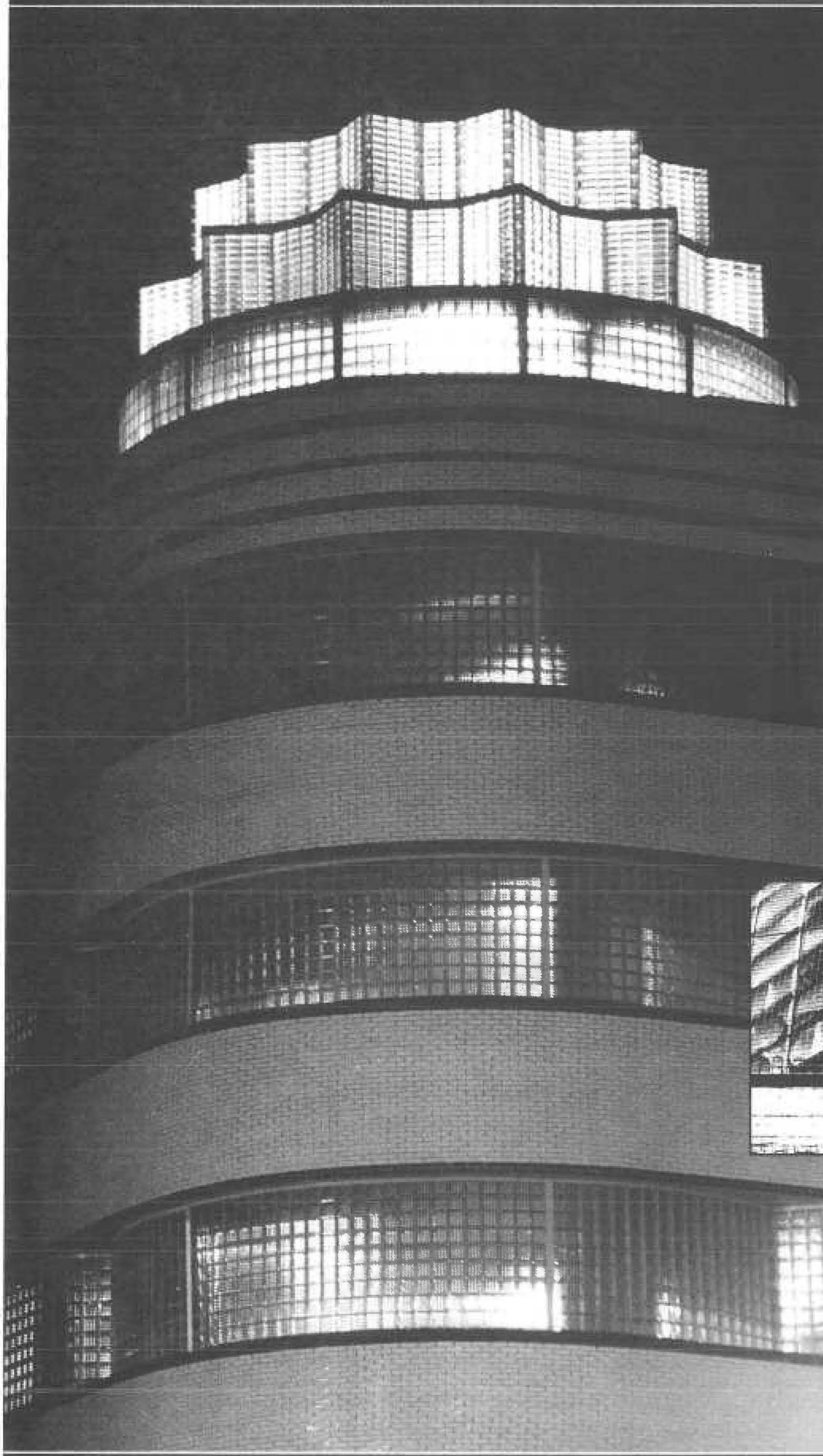
Photos: Wiss Janney Elstner Associates

On its dedication in 1937, the Hecht Company's 400,000 square foot distribution and storage facility in Washington, DC was the largest warehouse south of New York City. But it wasn't only the warehouse's enormity that had the capacity to enthrall, it was the streamlined curves and novelty of its glass block and glazed brick facade. A common element in buildings of the 1930s, glass block was emblematic of our nation's fascination with technology. However, its popularity waned with the rise of new technologies and by the late 1970s the last manufacturer of glass block was ready to cease production. An outpouring of support from the architectural community rescued it from extinction, but that was only part of the battle. Many early applications were showing signs of advanced decay, but few, if any, building professionals had any experience repairing and preserving it.

The Hecht Company Warehouse is a case in point. The glass block and glazed brick walls of the six-story reinforced concrete warehouse are some of the first, and best, examples of block construction. In 1990 the company's local facilities manager had set to work on a plan to repair much of the building's damaged walls, remove a three-level prismatic-glass crown atop the curved wall of the northwest stair tower, and dismantle the parapet wall. After local preservationists heard of the company's plan, they were able to stop the work and grab the attention of corporate managers. A year-long negotiation among the city, the May Company—Hecht's parent organization—and local preservationists culminated in a landmark designation for the original building and one addition and preliminary approval for an investment tax credit. With the way cleared for work to begin, the architecture and engineering firm of Wiss Janney Elstner Associates (WJE) was retained to develop and oversee a complete restoration.

A NEW TECHNOLOGY FOR A NEW ERA

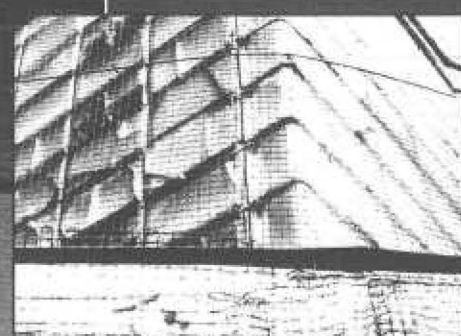
The popularity glass block enjoyed after the Owens-Illinois Company introduced it at the Century of Progress Exposition in 1933, was reflected in statistics reported by the industry in the May 1940 *Architectural Forum*; in just over five years of production more than twenty million blocks had been sold. While much of the product's success was attributed to its novelty and use as a decorative material, its adoption by industry was claimed to be an indication of glass block's true merit. Its unique architectural effect, its ability to provide a more uniform diffuse light, with lower heat losses than standard window glass, and a unit cost only slightly greater than brick construction made glass block an



opposite page, left. **At the northwest corner of the Hecht Company Warehouse, ratcheting movement caused by the cyclic expansion and contraction of the over-300-foot-long brick and glass block walls had forced the base of the wall to slide outward nearly four inches. To prevent the wall from collapsing, Hecht hired contractors James Buch and Sons to stabilize the wall with six-inch square plates bolted through to temporary steel braces on the interior.**

opposite page, right. **The damage at the northwest corner was so severe that Wiss Janney Elstner, the restoration architects and engineers, recommended that it be rebuilt. Because the warehouse was a designated Washington landmark, the new wall had to be built with nearly 10,000 glass block custom manufactured to match the discontinued original units.**

left. **The restored crown, which tops the stairtower at the northwest corner, was rebuilt with a commercially available glass block that nearly replicated the original. Once complete, pink and green neon tubes were installed inside the crown to replicate the lighting that once made the warehouse a landmark along New York Avenue.**



above. **Deterioration in the glass block crown was so advanced that the company's local facilities manager had been forced to wrap the structure with wire mesh.**

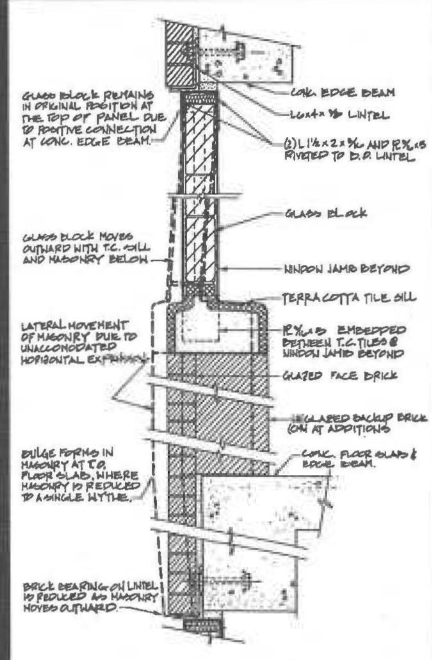
appealing material. So much so that Gilbert V. Steele, a partner in the New York-based engineering and architecture firm of Abbott, Merkt & Company incorporated glass block into the facade of the Hecht Company warehouse.

While the glass block walls may have signaled the rise of an era of technology, they were an imperfect technology at best. Architects' and engineers' knowledge of how these new products behaved did not keep pace with the growing industry. Today the limits of their knowledge is evident in the cracks, bows, and warps that mar the facades of many buildings—irrefutable evidence of years of unaccommodated thermal expansion and contraction.

EXPANDING DETERIORATION

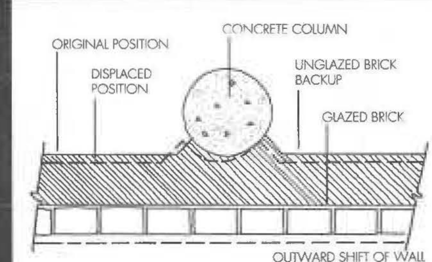
Deterioration in the long uninterrupted glass block and glazed brick walls of the Hecht warehouse were a prime example of failure attributable to thermal movement. Restrained at each floor by a positive connection at the top of the wall and by friction and the adhesive force of the mortar at the base, the expanding walls bulged outward, pulling out wall ties, cracking and crushing brick, and shattering glass block. A triangular fillet between the masonry spandrels and the round concrete columns of the frame, an innocuous detail meant to improve the quality of the interior finish and minimize housekeeping, wedged the expanding wall farther away from its supporting lintel.

These problems were exacerbated by two additions to the original building—a six-story wing built in 1948 and a four-story wing built in 1961. Displacement caused by the ratcheting action of thermal expansion and contraction was compounded by movement in the two additions. By 1948, when the first wing was added, the original walls had accumulated a decade of displacement, and, according to Jerry Stockbridge, WJE's partner-in-charge at the project, "may or may not have been stable, but had probably moved about as far as they could." When the new walls, which were built with the same materials and methods used in the original construction, began exerting an expansive force there was was little resilience left in the old walls to counteract the movement; the old walls were pushed farther off their sup-



TYPICAL WALL CONSTRUCTION AND DISTRESS (NTS)

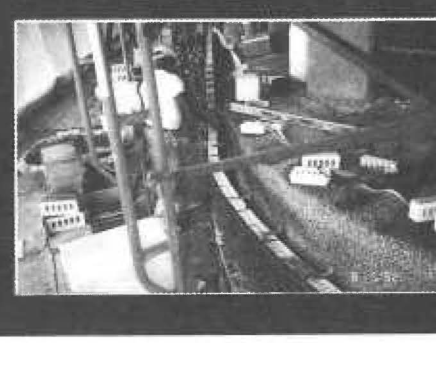
A positive connection between the glass block and the concrete edge beam prevented the top of the walls from moving. Because no similar connection existed at the bottom of the wall, which sat on a steel shelf angle, the ratcheting movement caused by years of unaccommodated cyclic thermal expansion and contraction forced the wall outward and off the lintel. The lateral movement caused by the horizontal expansion also formed bulges in the wall. These typically appeared along the floor slab where the masonry thickness is reduced to a single wythe.



TYPICAL WALL SECTION AT COLUMN, PLAN VIEW

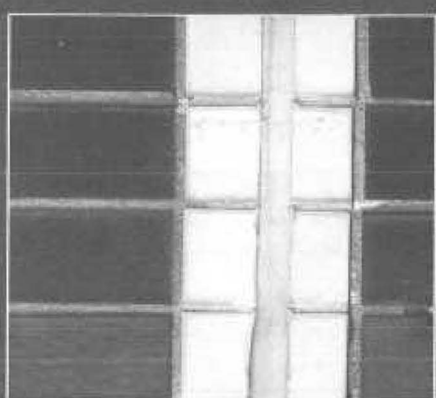
Outward movement of the walls was increased by triangular concrete fillets between the spandrel and the first row of interior columns that wedged the wall outward as they expanded. These fillets were not removed in the recent restoration. Engineers at WJE felt new expansion joints in the walls would prevent further wedging.

James Buch and Sons, a local restoration contractor, stabilized the facade by installing temporary steel braces every 6 feet along the interior of the walls. The braces are secured to the concrete slab with expansion anchors and retain a six-inch square steel plate fastened to the masonry with a 2-foot, $1/2$-inch diameter bolt. Evidence of the 3 $1/2$ inch outward displacement is visible at the base of the wall, where several bricks remained secured to the floor.

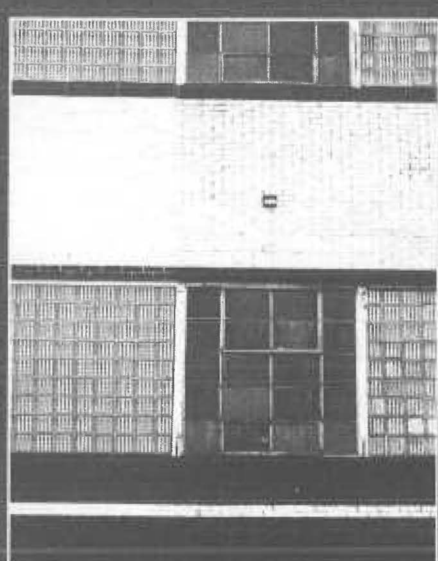


Once demolition of the old wall was complete, rebuilding began with new black glazed brick laid up in a mortar tinted with lamp black. Original terra cotta sills, numbered and removed during demolition, were reinstalled in the new wall. A CMU backup wall supports the brick facade where it passes above the concrete edge beam.

Expansion joints were placed approximately 50 feet apart and aligned with the outside edge of the steel windows that punctuate the glass block wall. To cut the ½-inch wide joints, the contractor's crew used a gas-powered circular saw fitted with a pair of 20-inch diamond-tipped blades. With the saw mounted on a steel track temporarily bolted to the wall, the crew made three to four passes with the saw to cut through the entire two-foot thickness of the brick. To avoid damaging the steel windows, the crew, working from inside the building, used hand saws at the end of each cut to complete the joints.



A polyurethane foam backer rod was pressed into the saw cut and the joint filled with sealant. White sealant was used for the majority of the joints, but a black sealant was used where joints passed through sections of black brick. The interior of the cuts were filled only where it was essential to minimize housekeeping expenses.



Expansion joints between the glass block sections of the wall and the steel windows had been installed as part of the original construction. While these joints prevented some expansion problems in the glass block, they were unable to accommodate movement in the brick sections of the wall. Engineers at WJE aligned the new expansion joints in the brick with the old joints in the glass so that the new joint runs continuously from floor to floor. The steel windows were inspected and reglazed where necessary. Mastic in the old rockwool-filled expansion joints was removed and the joints resealed as part of the restoration.

ports. The same phenomenon was repeated in 1961, when the second wing was finished, and culminated in dramatic deterioration and nearly four inches of displacement at the northwest corner where two 300-foot-long walls intersected.

Where the block was not shattered, cracks in the mortar had allowed moisture to sit on the bedding edges of the block, deteriorating the lead seal between the two halves of each block. This allowed moisture—and eventually water—to seep into the block where minerals borne by the moisture clouded the inside faces of blocks and trapped water froze, shattering the glass. Shortly after the original warehouse was constructed, glass block manufacturers started using glass fusing technology to seal the halves of the block. The new seal improved the durability of the material, and the damage in the newer sections built of these block was not as severe. Nevertheless, in 1990, the advanced state of deterioration on the facade that faced heavily-traveled New York Avenue compelled Hecht to erect a sidewalk bridge. They also contacted a local restoration contractor with whom they had worked before, James Buch & Sons, to stabilize the facades with temporary steel braces.

Once negotiations with local preservationists and the May Company were resolved, a team of architects and engineers surveyed the exterior from swing scaffolding. By using a metal detector and cutting a few small openings, the team located and recorded the condition all of the metal ties holding the glazed face brick to the masonry backup wall, and assessed the condition of the bricks and blocks. It became clear once the survey was completed that the bulging and deterioration in the walls could be stopped by installing expansion joints in the long walls and replacing deteriorated materials.

CONDITIONS & TESTING

Mortar samples taken during the survey were analyzed by WJE's testing lab to ensure physical, chemical, and aesthetic compatibility with the old brick and block. The water permeability of the terra cotta cap on the parapet was also tested. Having established the type and condition of the existing materials, WJE set about selecting and specifying materials for the renovation. Using the

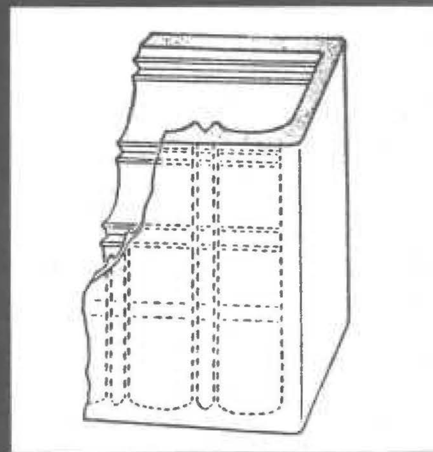
results of chemical analyses, they selected a mortar that was compatible in physical characteristics and color to the original mortar. To ensure durability and performance criteria were met, after the architects specified a brick with a color and size that matched the original, the new bricks were tested for compressive strength, 24 hour cold water absorption, 5 hour boil absorption, and glaze adhesion and compatibility.

One material remained elusive; the glass block. Because this was a landmark building, replacement block had to replicate the original pattern, but Owens-Illinois, the manufacture of the original Insulux blocks, was no longer in business and the pattern, called Number 17 in period catalogues, was not available from other sources. WJE approached Pittsburgh-Corning, the last domestic producer of glass block, with a request for a custom order. Because the original block was a nominal eight-inch square (by four inches deep), which matched the dimensions of Pittsburgh-Corning's standard product, the work of customizing the production line was manageable. A new die was made to replicate the pattern on the interior faces of the original block, but otherwise assembly remained unchanged.

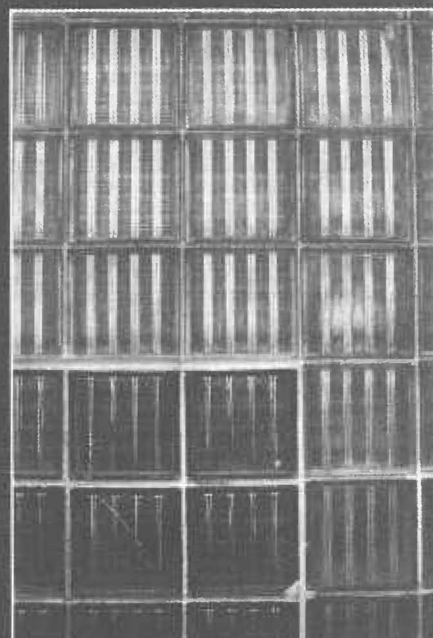
RESTORING THE WAREHOUSE

Once WJE finished the conditions survey and prepared specification, James Buch & Sons, began work on the restoration. Work proceeded simultaneously at several locations around the building. In the northwest corner the deterioration was so severe that WJE recommended rebuilding the curved wall of the stairtower—from the second story to the crown.

Buch's crews started the job of rebuilding by erecting a pipe scaffolding on the sidewalk bridge. Then they stabilized the existing linear sections of wall by installing expansion anchors. With the wall secured, the crew used a circular saw fitted with a diamond-tipped blade to make 1/2-inch wide cuts at the point where the curved wall intersected the long straight sections. With the limits of the new wall defined, demolition began; everything, including the common brick backup wall was removed. New steel shelf angles were installed at the base of each wall and the concrete edge beam covered with building felt, a self-adhesive flashing



This drawing of the original Owens-Illinois Company Insulux block shows that the pattern, called "Number 17," had smooth exterior surfaces and a series of ridges and hollows pressed into the interior faces of both halves of the block.



A lead seal between the two halves of the glass block used in the original building was particularly prone to failure. While better, the fused-glass seal on the blocks used in the 1948 and 1961 additions had also failed in some locations. In the photo, the whitish minerals deposited by evaporating water are evident on the interior faces of the old block.

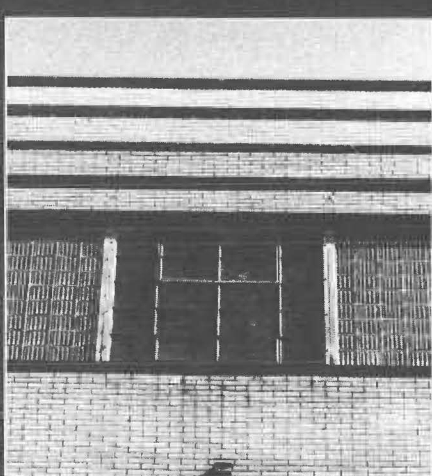
The new block walls in the crown (shown here) were rebuilt with a stock 4 x 8 inch block that nearly matched the original. A one-part portland cement, one-part hydrated lime, and three-part sand mortar was used with galvanized steel reinforcing in all new block construction. In restored areas of the building, the same basic mortar was used, but it was tinted to match the existing material.

Throughout the building moisture moving through the brick walls caused gradual swelling of the clay body of the brick. In the two-foot thick parapets, this swelling was made worse by water penetrating the terra cotta coping. Freeze-thaw cycling added to the cracking and crushing of brick caused by thermal movement, and was the primary cause behind localized spalling of the brick glaze.

On the parapets, crews cut out spalled brick and sections of deteriorated backup. Three shades of custom-matched white brick, one for each addition, and one shade of black brick were woven into the existing walls. The contractor stabilized all the existing walls by securing them to the masonry backup and concrete edge beam with expansion anchors placed on two foot centers and vertically staggered in every second horizontal mortar joint.

At 30 locations around the building, crews repaired nearly 500 feet of steel lintel. Where the brick wall had been forced off its supporting lintel, the contractor's crew welded on new sections of 1/4-inch steel plate that extended to the edge of the brick. Welds were placed in 1 x 2 inch notches cut every 2 feet long the plate. No bricks were removed during the repair procedure.

Once the damaged block and brick were replaced and the walls stabilized, the building was cleaned with soap and water.



Water seepage through parapet caps had caused significant spalling of the glazed brick on the face of the parapet. To minimize future seepage and spalling, WJE felt it prudent to repair the entire coping. A site-formed 0.050-inch black anodized aluminum sheet was selected for its low cost, minimal affect on the aesthetic composition, and ease of installation. Unlike other replacement materials, such as terra cotta, the sheet metal pans could be installed over the existing coping, reducing labor and disposal costs.

membrane, and drainage board before construction started on the new wall. As the new wall was laid up bricks were trimmed to allow the wall to follow the tight radius.

On the remainder of the building, crews removed shattered block and spalled brick before installing new units, secured the walls to the concrete edge-beam with expansion anchors, and, where necessary, extended the steel lintels by welding on new plates.

With the walls stabilized and rebuilt, Buch's crews began the all-important task of cutting expansion joints. WJE had calculated the overall coefficient of thermal expansion for the wall assembly and determined that 1/2-inch joints placed approximately every 50 feet would accommodate thermal expansion. To minimize the aesthetic impact of the joints, they were aligned with the edge of the steel window frames set into the glass block.

Joints were cut using a diamond-tipped saw blade in a circular saw set on a steel guide temporarily affixed to the wall with bolts. Each joint required three to four passes to slice through the two foot thick walls. The joints were finished by placing a foam backer rod in the cut and filling with a sealant.

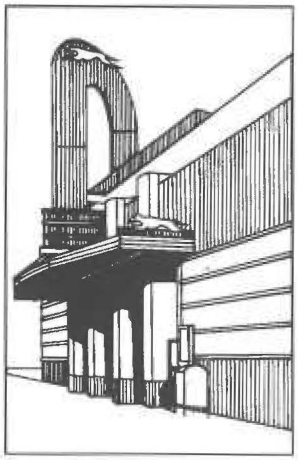
GLAZED AGAIN

Riding by the Hecht Company Warehouse in a car on New York Avenue or a New York-bound train, one sees the building rising majestically above a tangle of telephone wires, snarling trucks, and tumble-down repair shops. But, to credit the skills of the restoration team, the newly restored facades fit comfortably among these neighbors—not too clean or too shabby.

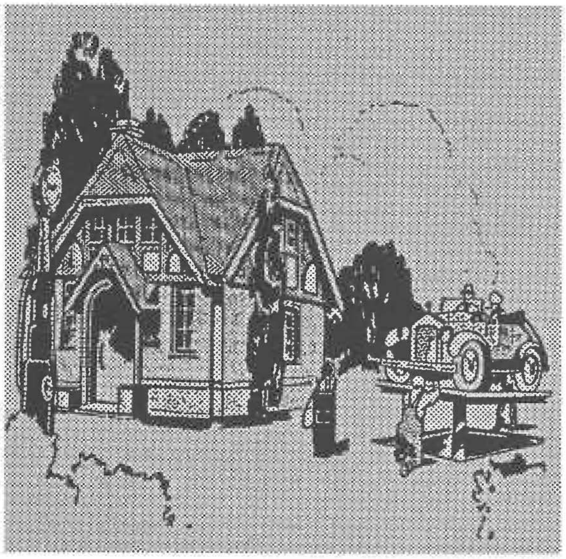
DEREK H. TRELSTAD

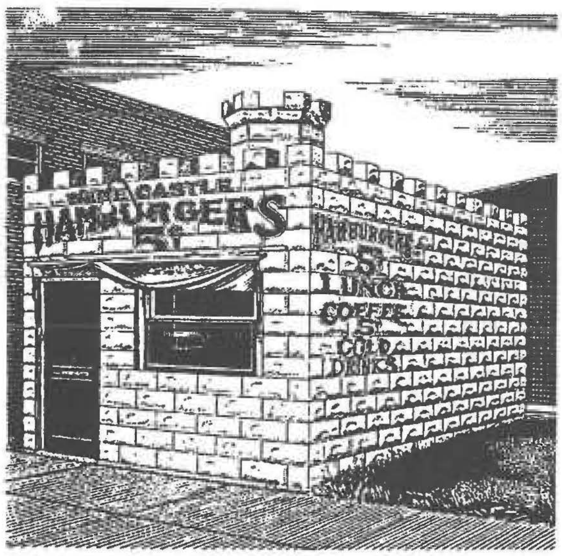
Assistance with this article was provided by Jerry Stockbridge and Dennis Carlisle.

Project: Hecht Company Warehouse, Washington, DC.
Owner: The May Department Stores Company (Lauri Etela, architect).
Architect/Engineer: Wiss Janney Elstner Associates, Inc. (Jerry Stockbridge, partner-in-charge; Frank Laux, associate).
Contractor: James Buch and Sons (Dennis Carlisle, project manager).
Building materials: Glass block: Pittsburgh-Corning. Brick: Elgin-Butler. Anchors: Retrofit Anchors, Dur-O-Wall. Sealant: Pecora.



Commercial Archeology Bibliography: Resources for the Road





COMMERCIAL ARCHEOLOGY BIBLIOGRAPHY

Resources For The Road

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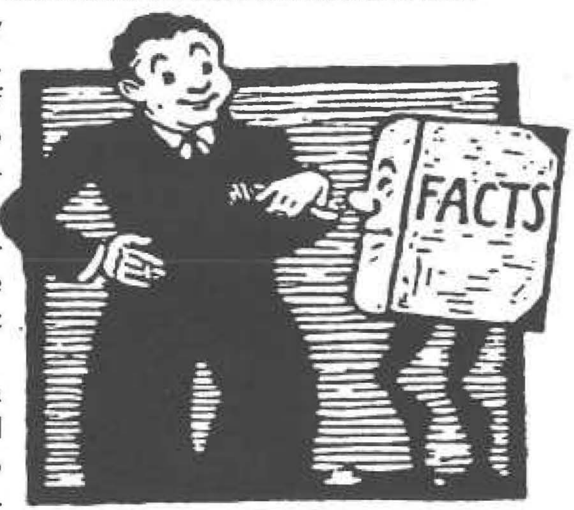
The subject of commercial archeology, broadly defined as the study of commercial environments of the automobile age, encompasses a wide variety of subjects. Some of the principal publications fall under the topic of history, with numerous architectural histories that offer typologies and histories of specific roadside structures. Other useful subject headings include advertising (including signs), art, consumerism, business history, marketing, popular culture, retailing, tourism, transportation, and travel. Commercial archeology is a fairly recent area of study. There is no current listing for this topic in the Library of Congress catalog. Not surprisingly, there are few publications listed here that were published before the mid-1970s. Those that were are more likely to be historic source material rather than contemporary histories.

The earliest publications that presented roadside environments as an area of historical and architectural investigation frequently began with the premise that these environments were banal and did not represent the standards of America's architectural critics. The first investigations of the roadside that sought to explain and understand these environments from a less judgmental standpoint came from two very different sources — cultural geographers and artists. The seminal writing of J. B. Jackson and the works of the photo-realist artists of the mid-1960s were two of the earliest commentators on commercial archeology. The subject of the artist and the roadside, particularly photographers, deserves special investigation beyond the limits of this listing. Similarly, the literature of the American roadside is another topic that deserves investigation.



With such a large subject, the task of preparing a bibliography begins by setting some self-imposed limits. The first of these was to limit the selections to books rather than articles and periodicals. For periodical sources the bibliography provided in Leibs' *Main Street to Miracle Mile: American Roadside Architecture* is excellent for a few specific building types. The second was to select publications on broad categories, such as advertising, automobiles, or highways, only when they provided a historical overview of the commercial highway environment. The third of these was to exclude technical publications on building and highway construction techniques. Lastly, tour guides and local travel guides have been excluded, except for some recent guides that offer a historical perspective, such as guides to Route 66. Despite these limitations, the reader will find that a substantial body of work on commercial archeology has already been published.

In addition to the general bibliographical listing, selected bibliographies have been developed for some of the more common subjects and some specific building types. For example, under the heading of "Food" the reader will find a listing of all publications pertaining to food such as restaurants and supermarkets, while a separate subject heading exists just for diners.

Anthologies, Compendiums and Collections

The tacit acceptance of the automobile and the changes it has caused the built environment to undergo are doubly strange when we stop to realize that many of the forms which it generated are now old enough to justify consideration as historic artifacts.

James Marston Fitch. In the foreword to *Filll'er Up: An Architectural History of America's Gas Stations*, 1979.

Today the enthusiasts of commercial form revel in what they view as the vitality and flash of historic roadside architecture, while critics are appalled by what they see as its tawdry vulgarity, crudity, and lack of aesthetic refinement.

Dan Bluestone. "Roadside Blight and the Reform of Commercial Architecture" in *Roadside America: The Automobile in Design and Culture*, 1990

In short, above-ground archaeology is a simple way of probing, identifying, and interpreting a landscape's extant artifacts, be they bridges or billboards, motels or motorways, in order to gain an increased awareness and understanding of life as lived in the past and present.

Thomas Schlereth. *U.S. 40: A Roadscape of the American Experience*, 1985.

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Our suburbs are interminable wastelands dotted with millions of monotonous little houses on monotonous little lots and criss-crossed by highways lined with billboards, jazzed-up diners, used-car lots, drive-in movies, beflagged gas stations, and garish motels.

Peter Blake. *God's Own Junkyard: The Planned Deterioration of America's Landscape,* 1964.

The image of the commercial strip is chaos.

Robert Venturi, Denise Scott Brown, Steven Izenour. *Learning from Las Vegas,* 1972.

The Strip shows the value of symbolism and allusion in an architecture of vast space and speed and proves that people, even architects, have fun with architecture that reminds them of something else, perhaps the harems of the Wild West in Las Vegas, perhaps of the nation's New England forebears in New Jersey.

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Diners

The classic stainless steel, streamlined diner could not have been a glint in the eye of Walter Scott, of Providence, Rhode Island, when he trundled down Westminster Street in 1872 in a light horse-drawn wagon laden with tasty sandwiches, boiled eggs, pies and coffee. This first "night lunch wagon" would undergo many stylistic changes as it evolved into the familiar roadside diner of the twentieth century.

Richard J. S. Gutman. *American Diner: Then and Now*, 1993

We can thank our luck that human life and art constantly escape from the models we construct for them. My generation, excluded the vulgar Pop world, emphatically including that of the Diner, from our consideration and, by precept, from that of our children—who then grew up and took it over and wove their fantasies into it and humanized it and made it art.

Vincent Scully in the foreword to *Diners*, by John Baeder, 1977.

> A lot of people ask me why I paint diners. It's a question I've never had to ask myself. I want to preserve diners. I love them. And I express my passion in the best way I know, by painting them.
>
> John Baeder. *Diners*, 1977.

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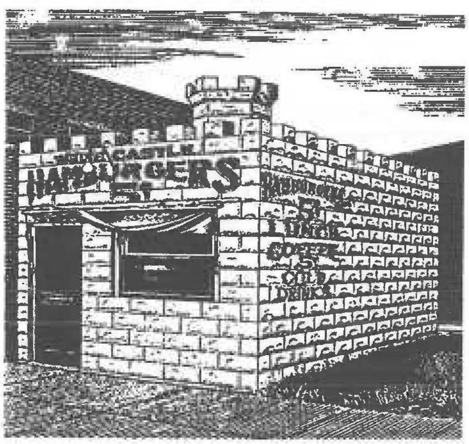

Food

Before the automobile was invented, before the streets were paved with asphalt, American had already started to eat in chain restaurants. In New York, in Baltimore, in other major cities and in a series of towns along the western rail routes, chain restaurants began to become a fixture of life in the late nineteenth century.

Philip Langdon. *Orange Roof, Golden Arches: The Architecture of American Chain Restaurants*, 1986.

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The buildings would have to be exactly like the new one their architect had drawn up with the golden arches. The name, McDonald's, would be on all of them, of course, and I was one hundred percent in favor of that. I had a feeling it would be one of those promotable names that would catch the public fancy.

Ray Kroc with Robert Anderson. *Grinding It Out: The Making of McDonald'*, 1977

. . . the Googie style became as much a symbol of the fifties as Elvis Presley or a '57 Chevy. Cultural expression is an important role of architecture. But the coffee shops also worked well by other measures of architecture: they solved the functional problems of a car-oriented building imaginatively; they used scale and form to create an urban strip architecture; their complex interior geometries showed an understanding of modern spatial concepts.

Alan Hess. *Googie: Fifties Coffee Shop Architecture,* 1985.

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The modern gas station did not burst full-blown upon the American scene. Early gas stations appeared in the first decade of the twentieth century, not as sophisticated designs, but as simple, ad hoc solutions to the problems of gasoline distribution.

Dan Vierya. *Fill'er Up: An Architectural History of America's Gas Stations*, 1979.

Teague had developed a series of gas station designs "which could be built in any part of the United States, in any location, of any material, on any shaped plot, with any number of service bays or none—and still maintain its identity as a typical Texaco station."

Walter Dorwin Teague, 1937, in *Fill'er Up: An Architectural History of America's Gas Stations, 1979.*

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Highways

The road is that physical sign or symbol by which you can best understand any age or people . . . for the road is a creation of man and a type of civilized society.

Horace Bushnell. "The Day of the Roads," *Work and Play*, 1864.

Roads are a realm of signs, a set of clues to the constantly receding mystery of nationality. The culture they have fostered has become a physical model of the fact that the "promise" and "potential" of America have congealed into a permanent system offering one set of promises after another, with the easy recession and the happy forgetfulness of a moving experience.

Phil Patton. *Open Road: A Celebration of the American Highway*, 1986.

And along the Great American Road, the Great American Roadside sprang up prodigally as morning mushrooms, and completed a circle which will whirl for pleasure and for profit as long as the American blood and the American car are so happily married.

James Agee. "The American Roadside" *Fortune*, Sept. 1934.

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Lodging

Much has been written about the auto cabin camp and most of it has been poking fun--at these curious little broods of frame and log and adobe shacks which dot the roadside with their Mother Goose and their Chic Sale architecture, their geranium landscaping, their squeaky beds, and their community showers.

James Agee. "The American Roadside," *Fortune*, Sept. 1934.

There was a time—not too long ago—when any study of motel design and programming necessarily began with a sort of apology for the early antecedents, the tourist courts, followed by a sort of genealogy chart of the rise toward respectability. Such apologies are no longer necessary nor fashionable. Motels have now come of age.

William Dudley Hunt, Jr., AIA. *Motels, Hotels, Restaurants and Bars,* 1960.

Ah, gentle drivers gliding
through summer's black nights,
what frolics, what twists of lust,
you might see from your impec-
cable highways if Kumfy Kabins
were suddenly drained of their
pigments and became as trans-
parent as boxes of glass.

Vladimir Nabokov. *Lolita*, 1955.

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Movie Theaters

I can remember a time when where we went to the movies was just as important as the movies we went to see . . . From the moment moviegoers arrived to buy their tickets, there was a sense of something special, a feeling that to step inside was to enter another time and place.

Gene Kelly, in Naylor, *Great American Movie Theaters, 1987.*

Through the collective and manipulative experience within the motion picture theater, the audience was emotionally, psychologically, and physically drawn into the action and immersed in a total environment that excluded all reminders of the outside world.

Maggie Valentine. *The Show Starts at the Sidewalk, an Architectural History of the Movie Theater*, 1994.

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Roadside Attractions

The boom in auto tourism saw the creation of the specially adapted roadside tourist attraction, which had no reason for existence except to attract tourists. The principle of the highway tourist attraction, established in the twenties, remained consistent even later, with the arrival of the Interstates. The most critical part of a spot's attractive power was the radiating pattern billboards that drew tourists from miles away.

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Route 66

66 is the mother road....

John Steinbeck. *The Grapes of Wrath*.

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Signs

A place is only as good as its sign.

> James M. Cain. *The Postman Always Rings Twice*, date?

The sign is more important than the architecture. This is reflected in the proprietor's budget. The sign at the front is a vulgar extravaganza, the building at the back, a modest necessity. The architecture is what is cheap.

> Robert Venturi, Denise Scott Brown, Steven Izenour. *Learning from Las Vegas*, 1972.

Neon came to America when a visiting American Packard dealer from Los Angeles named Earle C. Anthony bought two signs in Paris from the Claude Neon factory in the summer of 1923. . . . The police complained that the neon was causing a traffic jam and neon took California by storm.

> Rudi Stern. *Let There Be Neon*, 1979.

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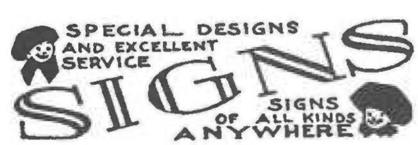


The Society for Commercial Archeology

The Society for Commercial Archeology (SCA) is the oldest national organization devoted to the commercial-built environment. The purpose of the SCA is to recognize the unique historical significance of that environment and the cultural landscapes of America, with a particular emphasis on the impact the automobile had on the shaping of our culture.

Our Focus

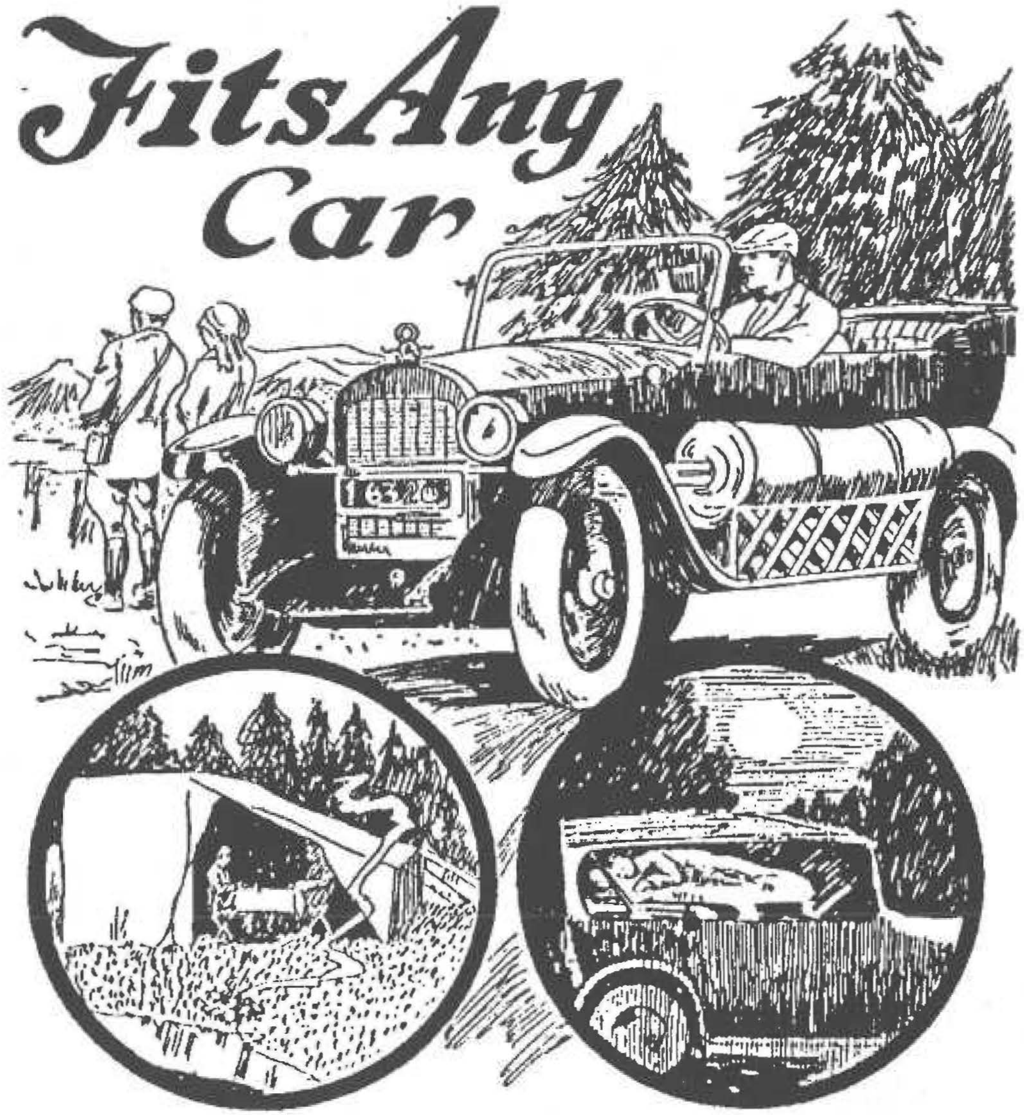
The SCA is interested in roadside development—diners, gas stations, tourist cabins, motels, drive-ins; transportation components such as significant highway routes and bus stations; features of business districts—movie theaters, drugstores, auto dealerships, department stores; and recreation facilities such as resorts, fairgrounds, and amusement parks. We are concerned with the artifacts, structures, signs and symbols of the American commercial process, encompassing the celebrated and anonymous work of America's best designers.

Our Activities, Your Benefits

The Society's goal is to promote pubic awareness and understanding of these significant elements of our heritage. To this end, we carry out projects of documentation, education, advocacy and conservation. Your membership entitles you to our quarterly newsletter *SCA News*, our semi-annual scholarly *NewsJournal*, other special publications, and invitations to special SCA conferences and tours.

Our Members

Beyond just artifacts, structures or publications, the organization's vitality can be found in its members. SCA members come from an extremely wide variety of backgrounds: architects, designers, educators, photographers, writers, historians, artists, collectors, archivists, municipal planners, motel owners, diner operators, and many others, all drawn together by a common interest. Membership in the Society for Commercial Archeology will allow you to get to know others who share your passion, giving you the opportunity to exchange information and still have a lot of fun along the way!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